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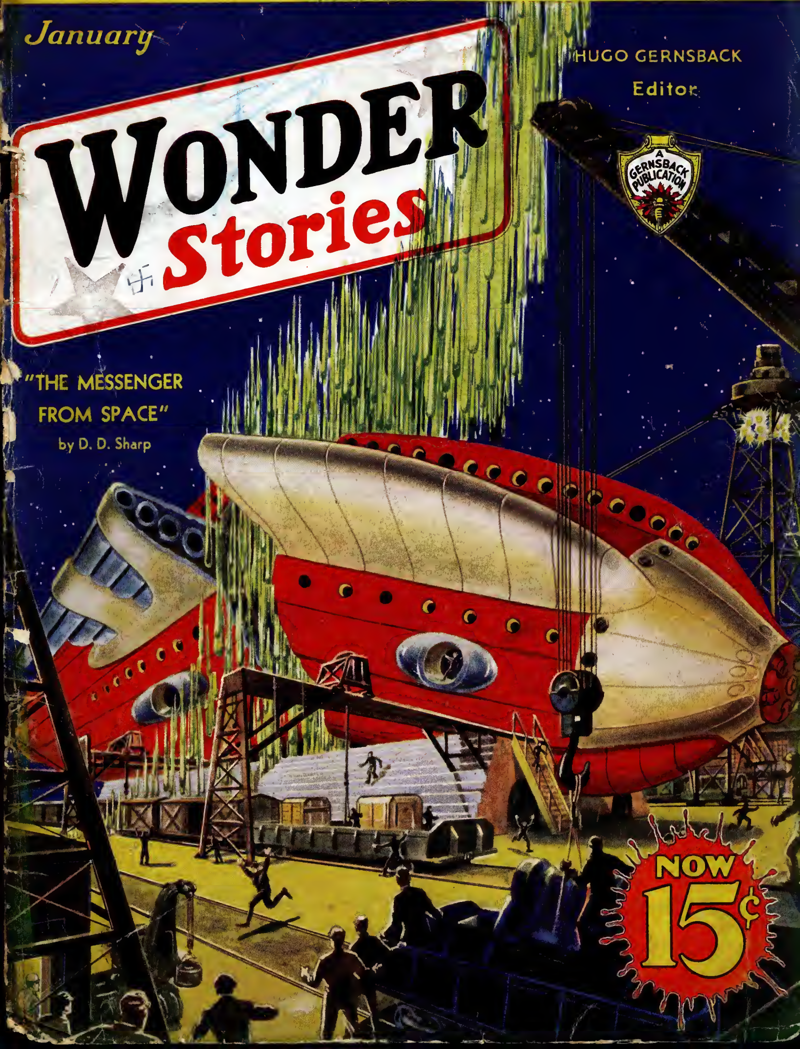

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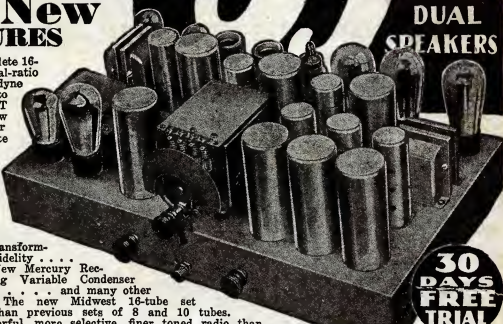

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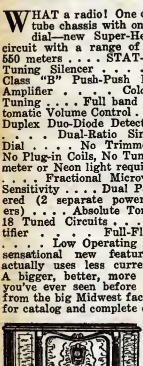

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With all her guns thundering the great battleship was swallowed into the maw of the monstrous protoplasmic mass.

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Slowly the mountain heaved and went flying heavenward under the impact of the gigantic released forces of the atom.

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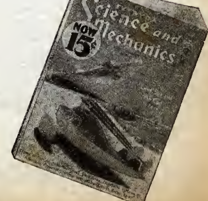

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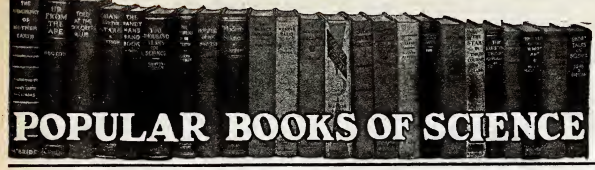

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WONDER Stories

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WONDERS OF MARS

An Editorial by Hugo Gernsback

● The Martian problem is one that has puzzled some of our best minds ever since the Italian astronomer Schiaparelli observed the markings on Mars which he termed "*canali*."

The brilliant Prof. Percival Lowell devoted a lifetime to the study of the fantastic markings, and he came to the conclusion that indeed they were canals, and he advanced many ingenious proofs of their existence. Most of the astronomers today are agreed that there are such canals, but they do not profess to know how they were constructed. Science, however, is unanimous on the point that if they do exist, and if they drain the water from the polar regions, as Lowell insisted that they do, then the Martians have solved the problem of making water flow "uphill."

This leads us to the thought of interest to most of my readers—if the Martians are such marvelous engineers, why do they not signal to us, and why have they not attempted to visit us by means of space flyers?

In the first place, we assume that the planet is or was peopled by super-intelligent beings. This seems logical, due to the fact that Mars, due to its smaller size, must have cooled many millions years before the earth and given rise to life sooner. But we do not know that Mars is still peopled today. If, indeed, the Martians were super-men, as no doubt they were, it is not impossible that the Martian canals are still functioning, and will function for ages to come, all without any existing Martians. In other words, their machinery set up millions of years ago might still be functioning. A race of supermen would have no difficulty in having the work done by robots and leaving this stupendous monument of their endeavors behind them for millennia after they vanished.

Secondly, the Martians might still be there. They might conceivably be a blind race, and have no interest in other worlds. On our own earth, we have the super-intelligent termites, totally blind, who can get along exceedingly well even thus handicapped. In fact, they have pretty nearly overrun our own earth.

Third, the Martians might have long vanished, leaving their work behind them, which we still see today. It is possible that they visited us some two or three billion years ago, shortly before their race vanished, and in this case, of course, we would never have been the wiser because our own earth was still molten and in such a state that it was impossible for them to make a landing.

Fourth, the Martians, high in their civilization, millions of years ahead of us, have long since studied the earth and its inhabitants and have come to the conclusion that there is nothing to gain by visiting the earth, let alone trying to inhabit it. The intelligent Martians might be afraid, for one thing, to land on this planet, because they would surely fall prey to our destructive germ life, which they could not hope to conquer.

Having a sufficiency of land, and having adapted themselves to their environment, the earth probably means nothing to them. For one thing, our much larger planet, due to its greater gravitational attraction, would prove destructive to them. A Martian weighing, let us say, 150 earth pounds on Mars, would weigh about 450 pounds on earth. He could not possibly accommodate himself to this excessive weight, nor would he be tempted to breathe our thick atmosphere without suffocating in short order.

For millions of years, the Martian has existed in a very tenuous atmosphere with a pressure of 2.5 pounds per square inch—less dense than that we find on top of the Himalayas. Suppose we apply the same reasoning to ourselves. Let us assume some planet where the normal human being, who weighs 150 pounds on earth would, transported to that planet in question, weigh 450 pounds, and where he would have to breathe an atmosphere that was so dense as to have a pressure of 90 pounds to the square inch. (The earth's atmosphere pressure is a little over 14 pounds per square inch.) Such a planet would not tempt the earth man for long. Indeed, he would stagger under his own weight, and in a few minutes would be so tired that he would have to lie down or collapse, not to speak of the suffocating pressure of the denser air.

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Illustration by Paul

Blake skilfully shifted the needles from point to point, probing ever deeper to reach the racial memories without injuring the delicate brain structure.

THE MEMORY OF THE ATOMS

By Nathan Schachner & R. Lacher

● Suppose that in the dark unknown past there resided a secret of incalculable value to the race, what might be done to recover it if all records were lost? That, in a sense, is the background of this unusual story. We know that in a sense we never forget anything of our personal experiences. But do we remember what our forefathers have passed through? And if we do how might we recover that memory? And if tremendous wealth and fame were the stake, what drama, what passions might be aroused? This exciting story portrays such an intrigue for great stakes.

● At the sound of the buzzer, Emery Mackington looked up at the televisor screen on his desk and closed a tiny black switch. The prim, repressed lineaments of Miss Selden, his private secretary, appeared on the screen.

"Dr. Blake is here." Her voice was flat, emotionless.

"Good! Send him in."

Mackington shut off the apparatus and turned toward the door. His keen, sharp features were alert, tensed on the coming interview. Riches, power, fame even, depended on its outcome. His eyes were narrowed a trifle, coldly calculating, as he nodded to the man who came quietly into the room.

"Have a seat, doctor," he said cordially to his visitor. They shook hands and Harvey Blake dropped into a chair facing Mackington. He was a tall young man with sandy hair and quizzical, faintly smiling eyes. The fingers that held his shapeless hat were as long and sensitive as a musician's.

For a moment there was silence. Mackington stared thoughtfully out of the vita-crystal window at the diffused panorama of New York. A good half mile away soared the gleaming, terraced tower of the Radium Trust, a world-wide combine that held a strangling monopoly on that fabulously precious element. Equi-distant to the east rose the tall smooth spire of the Metropolitan University, where Blake lectured on Mind Therapy and maintained his splendidly equipped research quarters.

Long, spidery, filament-bridges wove an interlacing web between the upper stories of the spaced structures, over which gyro cars spun noiselessly and rapidly.

Far below stretched a checkerboard of gardens and shaded walks, through which were wont to stroll leisured citizens of the New York of 2052. But today, as Mackington's eyes wandered downward, the great gardens were deserted. Instead of the usual strolling crowds, only an occasional moving dot could be seen, and that dot scurried along as if fearful of monstrous things lurking in the adjoining shrubbery. Something brooded over the city, something that even the sparkle of the afternoon sun could not dispel.

"Well?" Blake asked interrogatively, after a decent interval.

Mackington turned abruptly.

"Sorry," he apologized, "but it gripped me for a moment. That terror-stricken, dying city below and the sinister bulk of the Radium Trust gloating over it, battening on its misery, growing incalculably rich."

There was more than mere virtuous indignation in his bitterness. Mackington was one of the few independent radium dealers the Trust had permitted to exist. But when a strange cancerous-like plague of extreme virulence swept the Western Hemisphere, the Radium Trust promptly clamped down on its monopolistic sources of supply; sold the precious radium salts that were the disease's only check, at exorbitant, sky-rocketing prices. So that Mackington was left to stare dismally at silent offices. Only Miss Selden remained of all his employees.

Blake nodded sympathetically.

"I know," he agreed. "It's a terrible situation. That is why I am willing, eager even, to assist you in your plans. But—"

Mackington placed his hand decisively on his desk. His rather cunning features wreathed into a triumphant smile.

"Success!" he interrupted. "I've found her!"

"Her?" Blake echoed in surprise.

"Yes, why not? You don't seem pleased."

Blake smiled doubtfully. "Naturally I'm glad you have located a direct descendant of Herbert Wingrove. But," he hesitated, "I rather hoped it wouldn't be a woman."

"There is too much at stake for us to be finicky," Mackington replied rather tartly.

Blake did not answer directly. "Who is she?"

"A rather interesting case. A young girl of twenty-four, rather good looking, and—out of work. Some scientific training—not much—and on the verge of starvation." He rubbed the palms of his hands together. "Rather fortunate, eh doctor," he said meaningly.

Blake felt a faint distaste.

"Did she have her proofs?" he asked.

"Ample. Had all of her records from the beginning of the Public Record System." He read from a sheet on his desk. "Her name is Florence James. Her father was Carver James, chemist, killed in an explosion six years ago; her mother's maiden name was Mary Wingrove. Mary was the daughter of Frederick Wingrove, who was the son of Thomas Wingrove, son of Herbert Wingrove, born 1918, died 1964." He looked up triumphantly.

"Seems convincing enough," Blake reflected. "Did you tell her why we inserted a public notice in the News-Sheets for direct descendants of Herbert Wingrove?"

Mackington's eyes narrowed. "Of course not," he snapped. "We can't afford to frighten her off."

The young doctor's jaw tightened, his friendly smile vanished. "We've been over that before, Mackington. She *must* be told. The results of the operation are too doubtful for me to have any one's fate, much less a woman's, on my conscience, without her full and unreserved consent."

● Mackington flushed angrily. "And I'm telling you for the tenth time, Dr. Blake, it will spoil everything. Of course she won't consent; no one in her senses would. Better let me handle the situation; I have a very plausible story all prepared."

Blake stared at him levelly. "I shall not perform the operation," he stated in flat, controlled tones.

For an appreciable interval their eyes clashed, then Mackington shrugged his shoulders in a gesture of surrender.

"Very well, let it be as you wish. But your silly quixotism is endangering the lives of countless thousands of poor unfortunates, not to speak of our own personal fortunes."

"Let me be the judge of that," Blake said coldly.

Mackington threw the switch of the televisor. His eyes masked furious fires. Miss Selden's prim features flashed on the screen.

"Please have Florence James, who is now in the General Waiting Room, come to my office at once."

"Very well, Mr. Mackington." The screen went blank.

The two men sat back in their chairs and waited. Nothing more was said between them; both were absorbed in their own private thoughts.

The door opened timidly and a girl entered. She was slight and slender, with a pale thin face from which two large frightened eyes glanced hesitantly at the men. Her green and gold costume was patched and shabby with age, yet fiercely neat. Strands of dark chestnut hair strove rebelliously to escape from under a brimless turban.

Mackington came forward to greet her. "I am glad you are prompt, Miss James. I want you to meet Dr. Blake."

Blake bowed without taking his eyes off the girl. He felt a vast upwelling of pity for this poor, undernourished girl. She was pretty, he decided, despite the unmistakable stamp of malnutrition. And her face held more than mere prettiness; there was a certain poise and dignity and quiet charm about her.

"Please sit down," he said gently.

The girl sank gratefully into the chair he pushed forward. Mackington remained standing, his hands thrust carelessly into the pockets of his gaily colored tunic. His appraising glance turned from Blake to the girl, and back to Blake again.

"Miss James," Mackington spoke briskly, "you answered our appeal for descendants of Herbert Wingrove. Your papers are in order and appear satisfactory. You are no doubt curious as to the reason for our interest. Let me explain. The world is in the grip of a terrible plague. Only the use of radium salts can check the disease. Yet the Radium Trust demands such exorbitant prices for its supplies that very few sufferers can obtain the healing element."

The girl spoke low. "My mother died two months ago because we couldn't afford to pay the price."

"Exactly," Mackington went on smoothly. "Yet nothing can be done about it. Every known radium mine in the world belongs to the Trust. The very government is its creature. And the people are dying like flies, human sacrifices to greed."

Florence James looked up at him inquiringly. "But what—?"

"I'm coming to that. Some time ago I was reading some old books on Alaska. In every volume published during the 20th century I found references to a fabulous deposit of radium ore. Mere current rumors, possibly, but the various stories bore a startling resemblance to each other. Tracking these rumors back, through contemporary newspapers, I came at last upon their point of origin.

"In the year 1947 a man named Herbert Wingrove was found delirious and nearly dead in a little known pass of the Endicott Range in the frozen marshes of Northern Alaska. His rescuers mushed him into Fort Yukon, where for weeks he raved in delirium. The burden of his ravings, repeated over and over again, was the discovery of a great radium mine, incalculably rich in ore, in the secret fastness of the Range. When he recovered, however, his mind was blank. In spite of eager questioning, all memory of the supposed mine was gone. Yet his Eskimo servant, found dying some fifty miles from the point where Wingrove had been rescued, gasped something about a rich mine, miles of luminescent pitchblende, and then died, without a word as to its location."

The girl was sitting up now, her lips parted with repressed excitement.

Mackington went on. "Of course there was a stampede. Thousands joined a new rush for the mythical radium mine; hundreds succumbed to cold and hunger and wintry storms; yet no trace of the mine was ever discovered. Wingrove himself denied to his dying day any knowledge of what he had disclosed in his delirium. His mind remained a blank as to all his wanderings through the Endicott Range. When he finally died in 1964, the excitement had slackened; the radium mine became just another fabulous tale brought in by crazed prospectors. But I am convinced that the mine exists, and that it is of enormous wealth. We want the location of that mine."

Florence had listened in a daze to this ancient story of her ancestor. She had never heard of it before, yet . . . .

● "But I . . . how can I help . . . there are no family records . . ."

"We want you to understand first of all, Miss James," Blake interposed, "that Herbert Wingrove never made legal claim to his alleged mine; therefore any new discoverer could effect ownership."

Mackington put up a protesting hand, then thought better of it.

"We must make this clear," Blake went on relentlessly, "because you as sole surviving descendant of Herbert Wingrove, are essential to our plans for recovering the mine. It is necessary therefore that we trust each other implicitly. We are offering you a third share in any radium deposit we may find, the other shares to be divided ratably between Mr. Mackington and myself. I want it also definitely understood that one half of the total output, before any division of private profits to ourselves, be turned over without cost to recognized governmental institutions, medical clinics and research laboratories, for the common benefit of mankind."

"I refuse to be a party to any such absurdity," Mackington broke in violently. "Let them pay for the stuff; it is ours."

"Those are my terms," Blake said coldly. "I shall not take a step further unless they are strictly adhered to."

Florence looked in bewildered astonishment at the wrangling men. Squabbling over a mine that might have no real existence; or if it had, lost in the vastnesses of bleak mountains. If it weren't for her dire personal necessities, she would have slipped quietly out of the office, convinced that she was dealing with madmen.

"But, gentlemen," she cried, "I accede to any terms you may see fit to impose, but I—I confess I do not quite see the proposition. Of what help can I be? I—I thought when I answered your notice in the News-Sheets, there would be some present employment," she fumbled painfully for words, "some present salary, no matter how small, to—to keep alive with."

"My dear Miss James," cried Blake ashamed, "of course you will be on a salary basis while you are with us. A substantial one, I might add. And the terms stand too. Mackington agrees." That worthy glared, but said nothing.

A feeling of relief flooded the girl. Let them be madmen, anything, so long as they paid, kept her from the borderline of starvation on which she had hovered since her mother's death. Time and again she had prayed that the cancer plague might smite her too, relieve her of her hopeless despondency.

Blake smiled slightly as though he had read her thoughts.

"You must think us mad," he said pleasantly, "and with reason. But before I proceed with our story, let me introduce myself once more to give a solid-seeming foundation for what will sound like a fantastic dream. I am Dr. Harvey Blake, the Mind Therapist."

Florence half rose to her feet, awed. At their first introduction she had not connected the rather ordinary name of Blake with its rightful connotations. This pleasant, unassuming young man!

"Dr. Blake, *the* Mind Therapist," she repeated. "Why, the whole world rings with your miraculous achievements in Mind Therapy."

Blake waved it aside modestly. "I'm afraid the world overrates me. However, let us proceed with the matter in hand. You've no doubt heard of my work with high frequency currents to stimulate the memory cells of individuals."

Florence nodded eagerly. Even the popular News-Sheets carried full details of his epoch-making experiments.

"You know then my general theory," he pursued, "that the memory of no event is ever really forgotten; that it remains dormant in our brain cells, and requires only the proper chemical, or let us say electrical stimulation, to recall it to life. I have been rather successful in a great number of cases. Men suffering from complete amnesia have been brought back to normal; the memory of past events, of childhood memories, of infancy even, have floated to the surface under my instruments. There is no question that were Herbert Wingrove alive today, I could very readily extract from his unconscious the exact memory of his lost radium mine."

"I haven't the slightest doubt of it, doctor," the girl cried. "But now, what can you do?"

Blake smiled. "There have been other experiments," he said slowly, "experiments I haven't seen fit to divulge to the world yet. It is my belief that the germ plasm carries with it the concealed memories of all one's ancestors. Hence, on proper stimulation of the brain cells of a descendant of Herbert Wingrove, yourself, I shall recover, not only your own memory, but the submerged memories of Herbert Wingrove."

The girl gasped. "You mean to say . . ."

Blake nodded gravely. "That with good fortune you yourself will inform us as to the exact location of the lost radium mine!"

There was a long silence in the room. Florence felt dizzy; the room swayed around her. Unbelievable, impossible! yet this young man with the kindly eyes and pleasant smile was the great Dr. Blake. If he propounded fantastic things, they must be so. Then the full implications burst upon her. Wealth, unimaginable wealth; no more endless cravings for food, for clothes that were not patched and shabby; freedom to enjoy life, to travel, to hear great music; freedom for humanity from the dreadful plague that had taken such enormous toll in lives and suffering; the end of the Radium Trust's blood-flecked monopoly! Her temples throbbed; she raised her head suddenly.

CHAPTER II

Intrigue!

● Mackington's eyes were gloating with the satisfaction of one who sees the goal in sight. The girl was about to speak.

"Before you commit yourself," Blake interposed hastily, "let me warn you. My new experiments have so far been made only on animals; none on human beings. The operation for the recovery of an ancestral memory is infinitely more delicate and dangerous than the one whose technique I have perfected for the mere overlaid memories in an individual's consciousnss."

Mackington started a protest. "Really, Dr. Blake, there is no need—"

But the Mind Therapist waved him aside. "There *is* need. Miss James must be fully cognizant of what she is to undergo. If the operation does not prove successful, and at the present stage of my experiments, I cannot be assured of success, then Miss James will be made into an irremediable idiot, a gibbering hopeless thing to whom death itself would be a welcome release."

The girl faced him bravely.

"You will perform the operation personally, Dr. Blake?"

"I would entrust it to no one else," he assured her.

"And the chances of failure?"

"About even."

Strange how steady her voice was. "Then I accept. I am ready to submit to the operation whenever you are ready."

Blake grasped her slim hand with something like tears in his eyes. He had almost dreaded her acceptance.

"If it had only been wealth for ourselves, even for you who need it so much, I would never have dreamt of subjecting you to such a frightful ordeal; but there is the fate of humanity at stake. Even if the Radium Trust released its monopoly on radium, there is not enough being mined today to treat the plague-stricken multitudes. Unless new sources are discovered, the cancerous infection will soon be beyond control."

"I am not afraid," she said in low tones, her hand still resting in the firm warm grip of the young man. Their eyes met, and Blake dropped her hand, every fiber tingling. This was going to be more difficult than he thought.

Mackington, the business man, interrupted. He pushed a paper across the desk to her.

"This is a contract form of our arrangement. Will you please read it, and if it is satisfactory, sign here."

Florence tried to fix her attention on the long legal document before her. But the phrases jumped across the paper, the words became blurred.

She looked up helplessly at Blake. He smiled and nodded his head. Florence affixed her signature to the line at the bottom. Mackington carefully blotted it, pressed a button on his desk. The televisor remained blank, but almost immediately the door opened, and Miss Selden, the private secretary, came noiselessly into the room. Her face, severely plain and angular, held no expression.

"I want you to witness these signatures," Mackington said, holding the documents in such a way that only the names were visible.

The woman nodded, and after the task was finished, quietly left the room.

Mackington folded one copy of the document and handed it to the girl. "This is yours. Be sure to guard it well; don't divulge its contents to anyone, not your dearest friend. If our secret becomes known, the Radium Trust would be on our trail at once."

Florence smiled. "I have no friends," she said simply.

Blake felt an unreasoning desire to tell her he was her friend. Instead, he said: "Please report to my laboratories in the Metropolitan University tomorrow at nine. They are in Section 6—Suite 2434. We shall start at once."

After she left, and Mackington had bid him farewell with an eager, avid air as if incalculable riches were already in his grasp, Blake wondered at something very slight and trivial. How had Miss Selden appeared so promptly in Mackington's office at the summons? The outer anteroom was some four rooms beyond. And the televisor had been blank; that meant she had not been at her desk at the time. But it was a mere fleeting wonderment that was promptly forgotten.

Yet had he been able to follow the prim Miss Selden into the recesses of a private televisor booth that afternoon, his flickering suspicion would have been fanned into open flame.

She was dialing a secret number. A face stared up at her from the televisor, cold, unwinking.

"Your number," a voice demanded.

"K 23," she answered rapidly.

"Good!" A bodiless hand thrust athwart the screen, removed the shrouding mask. A slightly rubicund face with thick sensual lips and heavy jowls gleamed on the lit screen. Yet the eyes were ruthless, domineering. Norris Benson, General Manager of the Radium Trust, had not achieved his commanding position by following the ordinary course of business ethics, slight as they are. In normal times he permitted a few independents, like Mackington, to nibble at the edges of the industry. Thus he avoided any legalistic proof of monopoly, and gave a complaisant government the necessary excuse for not acting. But at the same time the Trust did not desire such small fry to develop into serious threats. Accordingly Benson managed to insert into the offices of every independent a member of the Trust's very efficient spy system. Miss Selden, as private secretary to Mackington, was in a specially favored position.

● "I have news, Mr. Benson," she spoke rapidly. "Mackington was in conference today with Dr. Blake, the Mind Therapist, and a girl named Florence James. I listened in. It's about a lost radium mine in Alaska that is supposed to be richer in ore than all the rest of the world's deposits put together." She went on with a detailed account of the conversation, the proposed operation to be made upon Florence James to recover her ancestor's memory of the location of the mine. While she spoke, a telautograph at the other end made a durable record of her report, signed it with a televised photograph of the speaker. There were no loose ends in the Radium Trust's organization.

Benson heard her through without remark. It was but another evidence of the reason for his eminence in the Trust that the fantastic story evoked no exclamations of disbelief. His face maintained its rubicund blankness, but his thought processes were lightning swift.

After a brief silence he spoke. "You will receive tomorrow, by tube delivery, a letter with our superscription, addressed to Dr. Blake, yet bearing the Section and Suite number of Mackington. This will obviously be an error on our part. See to it that Mackington gets hold of it. That is all, K 23."

The televisor went blank, and Miss Selden departed for her bachelor quarters in Residential Apartments No. 12, a bleak smile on her angular features.

* * * * * *

Florence James wended her way through the formal gardens of the city toward the tiny unlisted old-fashioned cottage on the outskirts. There would be only a slice of hard, dry bread and a modicum of tea awaiting her, but she did not care. Visions of future comforts, of leisured ease, intertwined inextricably in her thoughts with a certain tall, pleasant young man with quizzical eyes and long, sensitive hands. The coming ordeal held no terrors, such was her abounding confidence in the wizardry of Blake.

As she hurried along—she had no money for gyro-passage—oblivious of the deserted air of the paths, the furtive, terror-stricken expressions on the few human beings who had braved the grim outdoors, something happened that brought her to a sudden, overwhelming realization.

A huge gyro-bus, completely enclosed, dull black in color, oblong, sinister, poised on its monorail in front of a great terraced Residential Apartment. A lank, cadaverous man, dressed in rusty black tunic, sat at the controls. He was speaking into a microphone affixed to the control board, in a grating voice that comported well with the general malodorous air of the ensemble.

"Deliver your bodies into the drop-chutes for incineration. No plague corpses must be held, under stringent penalties. By order of the Council for the Americas."

Over and over he repeated the gruesome refrain.

Florence shuddered violently. Gone were her rose-colored visions. She knew only too well the meaning of this formula. Every apartment cubicle in the vast towering structure was hearkening to the dismal summons. The call went out on the government wavelength to which every televisor must maintain an open circuit.

The cancerous, infectious plague had reached such formidable proportions that the great network of government hospitals were choked with patients; unnumbered thousands were perforce compelled to fight the deadly tumorous growths in the recesses of their own homes. The supply of radium, limited in any event, was still more limited by the rapacious attitude of the Radium Trust. And thousands died each day, warty with bulging excrescences, blue-green in decomposition.

The ordinary channels for removing the dead had broken down lamentably. Thus it was that, to avoid a still fouler pestilence, this desperate method, reminiscent of the primitive Black Plague days of ancient London, was being employed.

Even as Florence was held fast, in horror-stricken attitude, the top of the sinister gyro-bus opened outward; extended a funnel-like projection under the chute-opening in the wall of the Apartments, and thump, thump, bump, bump, body after body careened into the doomful carrier.

The hideous noise broke the spell that held the girl fast-bound. She screamed and fled, down one path after another—heedless of passers-by who drew back in alarm from possible contaminating contact—unresting she ran until she had reached her own bare, poverty-stricken surroundings, and thrown herself gasping upon the miserable pallet upon which her mother had breathed out her last, only a few months before.

"Mother, mother," she sobbed with hot, remorseful tears. "I am selfish, unworthy. I thought only of my own miserable needs, of avaricious wealth, and not of yourself, of poor suffering humanity. Let Dr. Blake tear me asunder if necessary, but let him discover the secret of the mine, so that the healing element may be made available in abundance to all the sad plague-stricken multitudes of earth. I do not desire anything but that. Do you hear?"

● In the great white-lit operating theater of the Metropolitan University Dr. Harvey Blake was in earnest conversation with two white-gowned surgeons. They were his assistants, enormously skilled in the delicate manipulation of skull-trepanning.

Already Florence James lay white-faced, barely breathing, on the long, vitrine operating table. Local anesthetics had effectively dulled her nerve centers, yet left untouched the sensitive neurones of her brain cells.

Mackington lounged against the further wall with a feline expression, hands in tunic. Upon this snip of a girl depended fame, fortune, power.

Blake approached the recumbent girl.

"You are quite comfortable?"

Her head was strapped back, her chestnut hair shaven from a frontal area three inches in circumference, yet she managed a brave smile.

"Very well then. We shall begin."

The chief assistant, masked in aseptic white, focussed his magnifying spectacles carefully, adjusted fine screws on the radio knives attached to power-driven apparatus.

The second assistant wheeled into place a squat rectangular machine from which thick rubberized cables ran to a power-plug set in the wall. On the machine's upper surface were a bewildering array of sensitive meters, shiny chromed knobs and controls and a long movable cable that terminated in an extremely fine curved needle.

Blake checked the connections and adjustments with a hand that trembled slightly. He tried to attribute his unwonted excitement to the epoch-making experiment, to humanitarian impulses for a stricken world, to the prospect of increasing his own personal fortune even; but deep down within himself he knew it was for the poor, brave girl lying white before him. With an effort he nodded to his assistants to go ahead.

Holding the radio knife steady on its path, the first assistant made a careful incision that slit open the scalp on the shaven area. Then he laid the folds back deftly, exposing the skull. The radio knife was adjusted for greater penetration; and he went to work. Round and round the gleaming instrument bit, deeper and deeper it went. Blake was openly nervous now, even Mackington leaned forward with bated breath.

For ten minutes, the power-driven knife sliced through the bone. Nothing was heard but the slight humming of the apparatus. The girl's face was pallid, but so perfectly had the anesthetic been administered, that she betrayed no sign of pain.

Then as the thin tough blade sheared through the last section of occipital bone, at the exact adjustment for the thickness of the skull, the instrument stopped in its appointed course with a slight click. The surgeon leaned forward, disengaged the still quivering knife, and gently removed the circular section of bone. The masked face peered down at the exposed tissues; then nodded to Blake that all was well.

Blake exhaled a long sigh. His part, the most important and infinitely the most dangerous, had come. He could not tell how long his carefully husbanded nervous energy would last.

Moving to the surgeon's side, he stared down at the exposed greyish convolutions. He touched the girl's arm.

"You still wish to continue?"

"Yes." Her lips barely formed the word.

Blake turned to his high-frequency machine and snapped a switch. A motor hummed into life, filling the room with its song of power. He adjusted a micrometer knob, watching as he did so the dial of a frequency meter, listening intently to the increasing whine of the motor. He turned next to the output meter, twirled a knob until its needle crept toward a red line and quivered there in static ecstacy.

Then he scrubbed his hands in a wash basin filled with antiseptic fluid, dried them on a sterile towel, and lifted the fine curving needle.

"You understand," he said gently to the girl. "You are to relax completely, and keep your mind as free from disturbing thoughts as possible. Memory pictures, faint at first, then stronger as you let your mind drift, will float into your consciousness. At first they will be merely memories of your own past; do not disclose them; we have no wish to pry into your private life. But as soon as they relate to your father or grandfather, let me know at once."

"All right," she whispered.

His hand was steady now. The least quivering of the needle and irreparable harm would be done. He bent over, and very carefully brought the almost invisible needle tip into contact with the outer periphery of Berning cells. These tiny delicate structures control the memory functions. The outer layers hold in their convolutions the memory of the individual. This part of the operation was routine and had been performed by him time and time again. But deep within the slightly viscous layer lay the racial memory cells. At least that was Blake's theory, seemingly substantiated by his work on pedigreed mice. It was extremely difficult to get through the first layer of Berning cells without destroying them, and harder still to avoid coming in contact with certain motor cells that lay side by side with the inner layer. The least touch meant horrible idiocy, paralysis.

With tense fingers he applied the most delicate of pressures, shifting the inclination of the needle ever so slightly.

A cloud seemed to pass over the young girl's face, a startled look compounded with ineffable sadness.

"A memory has come to you of your own past?"

Florence shuddered. "Yes; it is terrible."

"Never mind," Blake soothed. "Just let the memories drift along."

CHAPTER III

Into the Past!

● For half an hour thereafter, while Blake skilfully shifted the needles from point to point, probing ever deeper with infinite care, trying to penetrate the individual memory cells to reach the racial memories without injuring their delicate structures, the girl went through a kaleidoscope of her earlier days. Some were sad, some pleasant, some that brought a look of horror to her careworn countenance, others that drew her lips into reminiscent little smiles.

Blake's face was drawn and tense now; beads of perspiration started out on his forehead, were instantly swabbed away with antiseptic towels by his assistants; the fine point of the sparkling needle probed ever deeper, yet still she had not progressed beyond her own thoughts.

Then suddenly, her face changed subtly. She seemed to be listening to far-off things; to be sensing unknown perceptions. Mackington took a step forward in his eagerness, but Blake, holding the powered needle steady, warned him off.

"What do you see?" he asked softly.

There was a moment of hesitation. The young girl's voice came as from a distance.

"A large room; a lecture hall; a young man sits leaning forward; he is absorbing the words of the lecturer; he looks like my father, only younger . . ." her voice died away.

An exclamation of triumph barely escaped Blake's lips. The three men looked on in hypnotic fascination. For the first time in the history of the world racial memories were being evoked from a living subject.

Blake shifted the needle ever so slightly; inserted its point a trifle deeper. The motor cells, dangerous to disturb, lay not a hair's breadth from the Berning cells he was probing. His face was white, his forehead gleamed with droplets of moisture faster than they could be wiped away.

"Try again," he breathed.

Once more the peculiar mask settled on the girl's face.

"My mother, a tiny girl in peculiar dress, is playing with her dolls, singing them a song."

Blake nodded. As the needle dipped deeper, events in past lives moved in rapid sequence. Back in time, back through the ordered, dignified life of her grandfather, Frederick Wingrove, back into the secret, twisted, not quite law-abiding pageant of Thomas Wingrove's colorful career. Interesting sidelights on ancient manners and customs were evoked as incidental to his turbulent life on the outposts of society. Florence lingered over them with a half-shocked smile playing around her pale lips. Incident after incident poured out in never-ending stream.

All very interesting and valuable, it was true, but Blake shook his head impatiently, and delved deeper. A little scream of pain from the girl and he released the pressure. Again details, and more details, of stout old Thomas Wingrove.

Mackington was leaning forward in his eagerness, almost impeding Blake in his work, a look of baffled rage on his countenance. Damn old Thomas, damn Blake! So near to the goal and yet so far. Why couldn't the girl leap that last barrier, come to Herbert's life?

Once more Blake went deeper, gently. Again the girl screamed. He set his teeth, withdrew the needle, turned off the power switch, mopped his pale forehead.

"Enough for today," he said resolutely.

Mackington was literally yelping.

"Confound you, why do you stop? We were on the verge of success. Another minute, and the girl would have told us what we're after."

"At the cost of her life," Blake returned sternly. "Look at her."

Florence had fainted, her lips were slightly parted; her breathing low but steady. The chief assistant was already at work. Very deftly he applied a silver plate to the trepanned portion of the skull. Then he folded back into the place the retracted scalp, and bandaged the whole tightly into place. Then and not until them, did he apply restoratives.

Mackington stepped aboard a gyro-car and was conveyed swiftly along the filament-bridge to the forty-second floor ramp of the General Laboratories Building. He was seething with resentment, all the more bitter because he knew it to be unjustified. Why had Blake stopped short just on the verge of success? Granted that the girl was screaming; let her scream another minute or so. Then they would have had the location of the mine. If the girl died, why—there would be more for his share. Blake was a stubborn ass—or was he . . . ?

Absorbed in such unpleasant reflections, Mackington entered his own office. He did not notice the look of fright on the ordinarily repressed face of Miss Selden. The letter from the Radium Trust was in her hands, but Mackington had gone straight to the operating room in the Metropolitan University that morning, instead of first looking in at his office, as he had said he would. Had the operation been a success; had the secret of the mine been already disclosed? Then the letter could serve no useful purpose, and her spying had been a failure. Benson listened to no excuses.

She dared not ask Mackington what had happened. She was not supposed to know. Yet the black look on his keen features was heartening. It did not augur of complete success.

● She held the incriminating letter out to her boss.

"There is a letter here for Dr. Blake," she said. "It was wrongly addressed to your office."

Mackington took the letter absently. His thoughts were still seething.

"It is very strange, sir," she slid in cunningly, "but it's from the Radium Trust. I wonder what business they have with him."

"Eh, what's that?" Mackington lifted his head sharply, startled out of his black mood.

His private secretary patiently repeated her observation.

He took one swift glance downward at the superscription. There stared back at him in neat gravure: "*Radium Products of the World.*"

Muttering something unintelligible, he dashed through the door, unheeding of the slow look of triumph that followed him, threw himself panting into his chair.

All the inchoate, hitherto absurd suspicions suddenly crystallized into tangible form. A long moment he stared at the sealed letter. Then he got up suddenly, his face set and determined. There was no slightest hesitation in his next movements. They carried him into a small laboratory. There he steamed the flap open, drew out the folded photostat insert.

It was a reckless, embittered man who leaped out of the gyro-cab in front of Nursing Residence No. 1, in which Florence James had been installed by Blake. Mackington brushed aside all opposition on the part of protesting nurses, forced his way into the pleasant sunny room. Florence was seated in an adjustable chair, gazing thoughtfully out of the wide flung window, her head swathed in bandages. Aside from a certain pallor that could be attributed to her former undernourished condition, she did not seem any the worse for her experience.

She looked up startled at Mackington's tempestuous entrance. That individual drove straight to the heart of the matter. The rage within him did not permit of polite preliminaries.

"He's a traitor; a doublecrosser!" he shouted at her, waving a blue photostatic letter.

"Why Mr. Mackington," she gasped. "What do you mean? Who is a traitor?"

He calmed down. "Blake!" he retorted bitterly.

The blood drained from her cheeks. She stared at him with unfathomable eyes.

"I don't understand," she whispered, as if to herself.

"Here; read this and you'll understand only too well." He almost threw the damning document at her. "This was wrongly addressed; came to my office."

She took the blue watermarked sheet with fingers that trembled in spite of herself. The graved scroll on the top stared back at her in accusing letters of fire, "*Radium Products of the World.*"

With an effort of will she read the rest, though the letters jumbled and pied dizzily before her eyes as the meaning slowly penetrated.

"Dr. Harvey Blake,
"Metropolitan University.
"Dear Dr. Blake:

"We are very much interested in your proposed experiment upon the racial memory of one Florence James, direct descendant of Herbert Wingrove. If the same proves successful, we agree to finance an expedition to discover the lost radium mine, and further agree to take title to the same in the name of Radium Products and your own as tenants in common. It is understood by us that title to the mine has never been vested in any person or corporation to date.

"We wish you every success in your interesting experiment and trust to hear from you immediately upon completion thereof.

"Yours very sincerely,
"RADIUM PRODUCTS OF THE WORLD,
"Norris Benson, General Manager."

Something shriveled within Florence; something that had been alive and laughing only seconds before. Her eyes focussed on infinity, blank, unseeing.

"Harvey Blake," the name was a whispered prayer, "you—did—this! I can't believe it." She turned suddenly on Mackington. "It's not true; it's not true," she cried, her voice like small beating hands. "He is too fine, too honorable."

Mackington stared down at her in amaze. Why, the girl was in love with the scoundrel! He felt a momentary twinge of pity, then it was thrust aside by his righteous rage, by the practical business man.

"A fine honorable man," he sneered, "trying to sell us both out to the Trust! The letter is plain enough, isn't it?"

She drew a weary arm across her bandaged forehead. "Yes it is," she whispered. Then suddenly she dropped her head into her arms; great dry sobs tore at her.

"That won't get us anywhere," Mackington told her roughly. "I have a plan; listen. We'll just turn the tables on the scoundrel. He tried to sell us out; we'll leave him out in the cold. Tomorrow he continues with the operation—"

"No," she sobbed thickly. "I don't want ever to see him again."

"You must," he said relentlessly. "There is no one else in the world who can perform it. When you finally achieve the memory of Herbert Wingrove, and of the mine, talk at random; fake up details of another location, make it hundreds of miles away from the true site. He will send the Trust off on a wild goose chase; in the meantime you and I will get to the real location, and claim it in our own names. By his treachery we shall gain a half share apiece instead of a paltry one third."

● She lifted her head, her eyes flashing. "Do you think I care one bit about the horrible old mine. All the money in the world couldn't tempt me to see that—that—wretch again."

Mackington was taken aback. Queer beings, women! One could never tell about them. He must try another tack. Then he smiled shrewdly.

"Forget about the money," he said smoothly. "I myself am not interested in financial rewards. But think of plague-stricken humanity. Think of the men, women and children covered with horrible bloatings, their bodies turning a ghastly blue-green, suffering the tortures of the damned, all for want of healing radium. What do our personal likes and dislikes count against the tragedy that has overwhelmed the world, and to which we have the key in our own hands."

She looked at him with a long, slow look. The picture of the black gyro-bus and its horrible freight was etched in her memory. She shuddered and rose, grasping his hand firmly.

"Very well, Mr. Mackington. It shall be as you say. Humanity needs the mine; they shall have it, entire. I do not claim one pennyweight."

Mackington smiled inwardly. "Poor fool!" A scheme was slowly forming in his ever-fertile mind.

* * * * *

Once again Florence James lay on the white operating table under the brilliant beating light. Her face was drained of color, partly from the ordeal she was undergoing, partly from the nerve-racking experience of seeing Blake in the flesh, pretending that nothing had occurred to change their relations.

The needle was probing back again in the life of old Thomas Wingrove. Time and again Blake stopped the pressure, asked if Herbert had appeared on the scene yet. She answered in the negative wearily. An hour passed, and Blake's brows were drawn together in deep furrows. He could not keep the girl under the torture much longer. Defeat stared him in the face. There seemed an impassible barrier over which the racial memory could not pass. His hand was weary, leaden-weighted.

Then it happened, the thing he had been dreading all along. The needle slipped from nerveless fingers, plunged erratically into the thick layers of hidden Berning cells. His sharp cry of horror brought his assistants and Mackington jumping forward.

"I've killed her!" he cried despairingly. He grasped for the half hidden needle, to repair the irreparable, when Mackington shouted:

"Leave it alone. Look, look at her!"

Blake's trembling hand paused in midair; they turned to the prostrate girl. Her eyes were open now, lit up with eager inner fires. She was seeing something, something she had not seen before.

Mackington's voice cracked with insane eagerness.

"You have penetrated; you are remembering the life of Herbert Wingrove?"

Her mouth was parted, her breath coming rapidly.

"Yes, yes," she gasped. "It is all very plain."

Cunning returned to the man.

"Don't talk yet," he warned. "Wait until the memory is completed; then you'll tell us. You might lose the connecting thread otherwise." He winked at the upward staring girl.

Long minutes passed, through which Blake lived uncounted lifetimes. Victory at last in his grasp, coupled with fear for the girl, for that deep-plunged needle.

Then she breathed heavily, said weakly: "All right now."

Blake leaped forward, drew the errant needle out from piled layer on layer of cells with infinite pains and marvelous skill. It was only when the glistening point appeared that he heaved a sigh of relief. Miraculously no motor cell had been impinged upon.

The assistants stepped forward now, replaced the silver plate, sutured the scalp in place over it, and bandaged it all again. Later, if no further racial memories were required, the removed skull bone, that had been kept fresh and healthy in certain saline solutions, would be skilfully riveted into its former position, the scalp resutured, so that there would be no visible sign of the operation.

Half an hour later, Florence sat in a comfortable chair, pale but composed. Blake and Mackington were the only ones in the reception chamber.

"You poor child," Blake said softly, "you have been through Hell. Thank Heaven it is over now. Tell us what you remembered."

The girl turned an unfathomable look upon the unconscious young man, shuddered slightly, and stated in slow composed sentences:

"I had been seeing Herbert Wingrove for some time, but only as the father of Thomas. Then suddenly my mind seemed to take a great jump. I *was* Herbert Wingrove, staggering wearily through a frozen tumbled land of mountains and precipitous chasms. A heavy pack weighted me down, an Eskimo servant stumbled along at my side. I suffered from hunger, from the bitter freezing cold. Our provisions were exhausted; there was no fuel, no timber, no brushwood in all that iron land with which to build a fire. We staggered out upon a grim plateau, swept bare of snow by the perpetually howling gales. The ground pitched and heaved into jumbled frozen attitudes; fantastic shapes lowered down on us at every step. The going was indescribably rough. The saw-toothed, towering mountains, cloud-enshrouded, kept sentinel watch on every side.

● "I was at the end of my resources; civilization hundreds of miles to the south; I knew I could never reach it alive. Then the Eskimo pointed. Something glittered in the tumbled rock waste. I approached. The rock was essentially granitic, through which velvet-black lustrous veins ran of conchoidal fracture. I recognized it at once. Pitchblende. But that was not all. The whole surface of the mineral glowed with a soft phosphorescence. And whichever way I turned, the rocks on that strange plateau were heavily veined with pitchblende, and the phosphorescence shone out at me with beckoning lure."

The two men were leaning forward, following her story with taut interest.

"I knew at once what I had found," the girl continued, still in the memory-person of Herbert Wingrove. "I stood like one in a daze, then I shouted, screamed, danced insanely around my bewildered Eskimo. I had stumbled upon a whole plateau of pitchblende, or uraninite, and the phosphorescence showed that it was literally loaded with radium. I made a hasty survey, tried to calculate the amount of radium-bearing ore, but my mind staggered, refused to believe. There were millions of tons on the surface of that plateau; the radium contents would be absolutely fabulous in amount.

"Then I heard my Eskimo shout a warning. I glanced around. A blizzard was sweeping down the surrounding mountains, the snow was hurtling toward us in thick white blankets; the storm wind shrieked and howled.

"It was imperative that we get out of that trap before it was too late. We shouldered our packs and staggered along the back trail. Then the storm hit us, enfolded us in its icy, blanketing maw. The rest is dim. I lost sight of the Eskimo; I stumbled and fell blindly onward; then I sank into a smothering drift, and knew no more."

Florence stopped. Blake's voice was tense. "But the location of the plateau; did Wingrove know where he was?"

The girl looked at him strangely, cast Mackington a swift sidelong glance, and answered slowly.

"Yes, he did; he carried compass and sextant with him. He took his bearings before the storm overtook him."

"What were they?"

A perceptible moment of hesitation, then:

"It was in the Endicott Range, just south of the Amuktuvuk Plateau; Latitude 67° 20′ 18″ N., Longitude 148° 12′ 42″ W."

Blake scribbled the figures down excitedly. Then he lifted his head.

"You have been marvelous, Miss James. Because of you the world will be able to combat the plague; the Radium Trust will be broken, and all of us, though that is not so important, will be unimaginably rich. Mackington and I shall get to work organizing an expedition at once. In the meantime you will require rest, careful nursing and plenty of good, wholesome food. Let me see you to the Nursing Apartments; I shall give orders how you are to be taken care of."

"It is not necessary, Dr. Blake," the girl said coldly. "I shall manage to get along without your troubling yourself on my behalf. Mr. Mackington, will you see me home?"

"Certainly, Miss James. I shall be glad to."

CHAPTER IV

A Race Against Death

● She rose, gave him her arm, and they walked out of the Reception Chamber, leaving a very much puzzled young man looking after them. He shook his head in wonderment: "Now what did I do to make her act that way?"

But think as hard as he could, there was no answer. He sighed, arose, and went into his library. There he took down an atlas, leafed through it until he came to Alaska. His pencil made a tiny circle around the indicated latitude and longitude. Then he tapped his teeth thoughtfully with the butt end of the pencil, and frowned.

From the girl's memory account, Wingrove could not have traveled very far in that terrific storm after the discovery of the radium mine before collapsing. Yet the newspaper reports that Mackington had delved into distinctly stated that the rescuing party had mushed into Fort Yukon with the delirious prospector. Why?

Fort Yukon was over 150 miles away, over the roughest sort of terrain. Yet here, staring him right in the face, was the little town of Coldfoot, less than fifty miles away from the indicated plateau. Surely the rescuers knew the country. Then a thought struck him. Possibly the town of Coldfoot did not exist back in 1947. He went rapidly to a historical atlas, found the map of the year 1935. There was Coldfoot, unmistakably in existence.

He frowned harder than ever at that. Then the picture of Florence James rose to blot out all other considerations.

At the Nursing Apartments Mackington turned eagerly to Florence.

"You were great," he said enthusiastically. "You put him off the track completely. Of course the location you gave him was false."

The girl turned a haggard, worn face to him from under the enswathing bandages.

"Yes," she admitted wearily, "it was." She was holding herself in, afraid to give vent to her emotions. If she did, she would crack irremediably. The world was a place of darkness, and nothing mattered. Blake, that pleasant boyish scientist, with his heart-warming smile, a treacherous, unscrupulous scoundrel! Impossible, her heart cried, but there was the letter!

She came out of a haze to hear Mackington's insistent voice. "What were the true bearings, Miss James?"

Slightly over eager, she thought, but nothing mattered.

"Latitude 65° 13′ 21″ N., Longitude 147° 31′ 11″ W.," she said wearily.

He carefully masked his triumph as he jotted the figures down. Poor, simple minded fool, he thought, how easily she fell into the trap. Split with her! What for? He had depended upon Blake for the financing of the expedition; he had no money of his own. Now that was out. Well, he would take a leaf out of Blake's book. He'd go to the Radium Trust.

They would be glad to finance him, give him the same terms they offered that scoundrel Blake. No, he'd demand more. Sixty-forty would be his proposition.

While his thoughts raced thus, he was saying smoothly to the girl:

"Now you just rest up after that terrific ordeal, and leave everything to me. I shall pretend to Blake that I am aiding him in organizing his expedition; meanwhile I shall be secretly at work on our own. It will take about a week. Then I'll slip away, head for Alaska, and stake the claim in both our names. That will be our revenge."

"I shall go with you, of course," she said quietly.

"Eh, what's that?" Mackington was startled. This did not fit into his plans at all. "My dear young lady, this will be no picnic. The country is rough and wild up there; you have a long convalescence ahead of you."

"Nevertheless I shall go along," she repeated, and there was that in her eyes that convinced Mackington there was no use in arguing.

He shrugged his shoulders in pretended surrender.

"If you insist."

"I do."

He left, cursing under his breath. But on his way to the office of the Radium Trust, his eyes brightened. He had found a way.

He had no trouble in gaining admission to the inner office of Norris Benson. That worthy evinced no surprise at the announcement of his name; he had been expecting some such result of his machinations.

Benson stared speculatively at the sharp, cunning features of the man before him. Shrewd enough, he estimated, but too shrewd for his own good. A man like that could easily be overreached.

At the same time Mackington's thoughts were busy. His restless brain was figuring out a new way. Make the Radium Trust finance the expedition; then hoodwink them as well as the girl. Then the whole mine would be his; to what dizzying flights of power could not such fabulous wealth carry him?

He cleared his throat.

"Mr. Benson," he commenced.

"You are Ellery Mackington," Benson interrupted in a cold, expressionless voice. "You dealt in radium on a small scale at our sufferance. Then the plague came, and considerations of public interest compelled us to cut off your supplies. You delved back in history, found mention of one Herbert Wingrove and a lost radium mine. You enlisted the services of Dr. Blake, noted Mind Therapist, found a descendant of Wingrove's in the person of Florence James. Dr. Blake has operated for two days; today he discovered the exact location of the lost mine. Blake has already sold out to us; now you are trying to do the same thing. It is all of little moment to us, as we already know where the mine is, and can get there ahead of you all."

Mackington staggered under the shock. All his fine plans tumbled in ruins about him. How had the Radium Trust gotten wind of everything so quickly? Blake of course! Blake must have come here immediately, divulged the secret. At that his lip curled; he even smiled. Blake had given Benson the false location!

● Benson saw the smile, and being a man of ready wit, felt that Mackington possessed certain information that even Blake had not laid hands on. For his last shot had been merely a shot in the dark. He knew Blake was supposed to be in touch with him. Blake had completed his operation that morning; Miss Selden had notified him of that. Therefore the information had been obtained; yet Mackington smiled. The man was cleverer than he had anticipated.

Mackington rose formally.

"In that case there is nothing for us to discuss. I bid you good day."

"Just a moment." Benson held up a restraining finger. "Blake has given us the location, but we know it is not correct." He was stabbing shrewdly now, his hard eyes watching Mackington's face like a hawk. "You have hoodwinked him; you know the truth."

The look of startled wonder on Mackington's face convinced him that he had guessed rightly. The man passed it over, laughed easily.

"You are quite right, Mr. Benson."

The General Manager continued on his careful, tortuous way.

"We had other sources of information. That is why we knew Blake's location to be false. I admit we haven't the exact dead center of the mine, but we know its general locale."

He had read up on old newspaper reports; found out where Wingrove had been discovered by the rescuing party. He mentioned the Endicott Range casually.

"We are correct within a radius of twenty-five miles. Our stratosphere planes will have no difficulty in locating the mine within hours."

A great feal enveloped Mackington. Perhaps it was true. Neither he nor Benson knew that the plateau was completely enclosed by high peaks, was but one of hundreds exactly similar in characteristics; that airplanes might search for weeks without discovering the right one.

"I am willing to discuss terms with you," he said warily. "I have the exact dead center."

Benson permitted no trace of inner exultation to appear on his fleshly features.

"Let us get down to business, then," he said dryly.

An hour later Mackington emerged, a smile on his lips and rage in his heart. A fifty-fifty division was the best he could obtain. The girl was out of the picture completely; he never troubled his head about her. Blake! He snapped his fingers. The man could do as he liked; the most he would get for his pains would be a wild-goose chase.

He had been sufficiently canny, too. In spite of Benson's skilful maneuverings, he stubbornly refused to disclose the ultimate secret.

"Prepare a fast stratosphere plane," he said flatly, "fully equipped for the Far North. I shall be on board, and direct the plane to its proper destination. I trust you as far as you trust me."

Benson granted his demands readily, too readily perhaps. It was arranged that the plane take off the next day at noon. Benson watched him go out, threw the switch on his televisor. The ground-manager of the Company's airport appeared on the screen.

"Jenks," he snapped. "Prepare a plane for the Far North, full equipment, to take off at noon. Mr. Mackington will present himself for passage. Use the *Skybird*." It was an old, but serviceable plane.

"And, Jenks, get ready the *Meteor* also, same equipment, full crew. I shall be on board. We take off a half hour before. Understand?"

The man answered very deferentially: "Yes, sir."

Benson snapped off the current, relaxed in his chair. A faint smile curved over his sensual lips. The *Meteor* was the fastest plane in the service!

● Florence James had passed a terrible night. The image of Blake, with his sandy hair and long sensitive fingers, obsessed her restless tossings. His gray, quizzical eyes seemed unwontedly grave; were reproaching her for something. She rose in the morning with something like relief.

Blake was a traitor, she told herself over and over again, but it was cold comfort. Perhaps, perhaps there was an explanation. She thought of the letter, of Mackington. She conceived a violent distrust for the man; she berated herself for disclosing the secret to him. Something drove her; she must thrash the matter out at once, finally.

She dressed with feverish haste; her head was dizzy, the bandage in place, but she disregarded everything. She would see the two of them, have Mackington denounce Blake, hear his answer.

A nurse appeared, stared at her startled. But Florence brushed her aside with a strength ordinarily beyond her, fled through the corridors out into the open.

It was five miles to the General Laboratories Building, but she had no funds. She must walk the whole way. The sun was high overhead now; it must be near ten.

At twenty minutes to twelve, half fainting, inexpressibly weary, she appeared in the anteroom of Mackington's offices.

"I must see Mr. Mackington at once," she managed to gasp.

Miss Selden surveyed her coldly. "Sorry, Miss James, but he hasn't come in yet."

"Where is his home, then?"

"I am not permitted to disclose Mr. Mackington's private residence," the secretary said primly. She was fully aware that even now Mackington was on his way to the Radium Trust's flying field.

Florence swayed slightly, gathered her strength. She would go to see Blake alone then. The gyro-car landing beckoned alluringly, but she had no money. Therefore she entered the swift, downward-plunging elevator. The operator was a negro, with all the sunny, garrulous disposition of his race. He had seen Florence on her previous visits.

"Mornin', Miss," he greeted her with flashing grin. "Too bad you missed Mistah Mackington. He done left only ten minutes ago."

The girl straightened sharply. The car was rushing smoothly toward the ground.

"Mr. Mackington was here, in his office this morning?" she cried.

"Sho' was. De gyro-man at de landing say he left in a great hurry. Took de car to de flying field o' de Radium people. Yes, ma'am."

A clear white dazzling light illumined every hitherto dark corner in the girl's brain. Pain, opened skull, bandages, everything was forgotten. She saw the whole plot in all its devious ramifications.

"Stop the car!" she cried.

The startled negro obeyed, unthinking.

She gripped his arm with surprising strength.

"Sam, have you a half dollar?"

"Why, why, yessa; sho' have."

"Give it to me, Sam!" Her peremptory tones brooked no opposition. "And run me back to the gyro-landing as fast as you can. This is a matter of life and death, Sam."

"Yessa, Miss," the trembling darky replied.

Blake was pacing up and down the confines of his private office, worried. Mackington had an appointment to meet him there at eleven and had not shown up. Communication with Miss Selden obtained the putative information that he had not come in as yet. Then there was Florence James. Blake realized now that this thin, worn girl held a strange interest for him. Yet she had turned unaccountably cold at the last operation, treated him with a cruel brusqueness that seemed foreign to her nature. Then the location of the mine as related by the memory-recovery of Herbert Wingrove—there was something suspicious about that too.

All in all it was a very uncomfortable young man upon whom Florence burst in, her head a mass of bandages, her face aflame with urgency.

"Why, Miss James," he gasped with instant solicitude. "You are very ill; you should never have come."

She brushed aside all mention of her personal condition.

"I have news," she cried pantingly, "terrible news! Unless we do something, at once, the mine will be stolen."

He stared at her in amazement.

"What do you mean?"

She went over the story very rapidly, the color mantling to her cheeks at the readiness with which she had suspected Blake of complicity. But she told her tale bravely, omitting nothing.

"It was only when I heard just now that Mackington had left for the air field of the Radium Trust that I understood. He has set me against you, and himself sold out."

She grasped the young scientist's arm in forgetful eagerness. "We must do something. If the Radium Trust get the mine, it will be all over. Humanity will never benefit from its discovery."

Blake, the scientist, became at once the man of action. His jaw set grimly, his eyes blazed with unwonted fires.

He spoke rapidly. "Mackington no doubt is piloting a Radium Trust plane northward by now. There is only one thing left to do; follow, try and get there first. If not," he crossed to his desk, snapped open a hidden compartment, extracted a tiny dynol pistol which he slipped into his pocket. His unspoken words were eloquent.

● "You have a plane?" Florence asked eagerly.

"Yes; my own." He snapped the televisor into action. "Miss Kay," he said quickly, "get the plane garage; tell them to put every man they have on my plane. It's to be fueled for long range flying; plenty of food and rig out my altitude suit."

"Tell them to make it two suits," Florence interrupted.

Blake turned from the visor. "What for?"

The girl's chin jutted out determinedly. "I'm going along."

"You're crazy!" he exploded rudely.

"Crazy or not; I'm going! Don't waste precious moments," she cried angrily. "Remember, I haven't told you the correct location yet; and I won't unless I'm on the plane."

The two glared at each other for a moment, then Blake surrendered unconditionally.

"You little fool!" was all he said. But into the visor to his waiting secretary: "Make it two suits complete."

It was nearing midnight. The northern sky was a black void, pricked by lambent stars. Far below billowed and heaved an ocean of gray-white cloud masses, thick and ominous, completely obscuring all signs of the earth beneath.

Blake peered anxiously with red-rimmed eyes through the bottom crystal port of the enclosed cabin.

"Can't see a thing," he said to his companion, "but the induction compasses set us at approximately the right location. The Endicott Range must be below us."

He was tired and haggard from the long hard flight at maximum speed from New York. For almost nine hours he had kept a steady stratosphere course of five hundred miles per hour. At no time had he glimpsed the plane that carried Mackington and the emissaries of the Radium Trust.

The girl sat beside him, taut, wan, but upheld by inner fires.

"Why don't we go down, then?" she challenged.

"There's a blizzard raging below," he explained. "It will be almost certain death to try and land in this mountain country during a storm."

"But Mackington is ahead of us. Perhaps he's landed already. Don't you see?" she cried despairingly. "It was all my fault; this terrible mess. We *must* get down there before him."

Blake set his teeth. "Very well, I'll chance it. I'll fly you to Coldfoot, set you down. I won't have you risk your life. Then I'll come back, and if Mackington's already on the ground, well, one of us will not be in a condition to stake out his claim."

"I won't allow it," she retorted vehemently. "I am going with you."

They quarreled bitterly, ridiculously, over that, wasting precious moments, while the plane circled and circled in the frozen reaches of the stratosphere.

Florence had thrust her head angrily to one side at an especially impassioned plea of Blake's. It brought her line of vision direct with the southward opening port. Her sight thrust angrily out, swung aimlessly, and held suddenly taut. Forgotten her anger, her quarreling.

"Look, Harvey," she cried. She was pointing excitedly.

Blake leaned over from his controls, stared out.

A plane was diving downward from the fifteen mile level, not five miles away. It glimmered faintly in the pale starshine. Unhesitatingly it held its dive; it reached the massed earth clouds below, cleaved through them at terrific speed, was swallowed up in smothering billows.

"Mackington!" Blake shouted, and swung his plane around. He had beaten the traitor then in the race north, and had lost his advantage in foolish quarrelings. He cursed under his breath, and set his controls. He was going down after, girl on board or no.

Then Florence cried out again. Swooping down from the eighteen-mile level like a hurtling meteor, glowing faintly with the friction of its dizzying speed against the thin atmosphere, came a huge airplane. Down and down it plunged, on the tail of Mackington's plane, until the clouds swallowed it too.

"The *Meteor!*" Blake ejaculated. There was only one plane in all the world that could act like that; the famous racing plane of the Radium Trust.

"Good God!" Blake cried again. He could see the plot in all its ramifications now. Conspirator was double-crossing conspirator. Mackington was in the first plane, unwitting that he was followed. Evidently he had been cautious; refused to disclose the bearings. The second plane held armed men, ready to beat Mackington to the plateau in landing, or if necessary, snuff him out like an ancient candle and take possession in the Trust's sole name.

Blake flamed with battle lust, the urgings of bygone ancestors. He jerked his pistol out, laid it on the seat beside him, swung hard on his controls.

The plane turned with a sickening swoop, dived headlong.

"What do you intend doing?" Florence cried. She was alarmed now, ready to back out, woman-like, not for her own sake, but for fear of the danger to Blake. She realized now what he meant to her.

"Going for them," he answered briefly, and relapsed into silence.

The ominous cloud masses rushed upward at a dizzying rate, then the nose of the plane smacked wetly into the upper layer. The next instant they were in a world of unrelieved grayness, flying blindly through layers and layers of the ocean of frozen, dripping mist.

Blake watched his instruments. At the five thousand foot-level he threw out of his tail dive into a more gentle slant. They were through the upper cloud layers now, were enfolded in a howling Arctic blizzard. The gale screamed against them; the dull leaden air was thick with drumming sleet and great white flakes of snow.

Beneath stretched a terrain that was lunar in its jagged desolation. Somehow they had missed the encircling mountains, were slanting down toward a grim plateau. Not an inch of its surface was level or smooth; it was a tumbled, jagged waste literally bristling with huge needle-pointed rocks that glittered icy in the driving snow. It was madness to land on such hellish terrain even under the most favorable conditions; it was suicide in this whistling gale of driving sleet and snow.

Then Mackington's plane blundered into view, ghostly, ice-covered in the raging darkness. It dipped and came up again, swung around in hesitant circles.

Blake leveled off his flight, to watch what his antagonist would do. Then a thunderbolt dived out of the cloud roof straight at the unconscious plane. A streak of fire spurted out of the side of the *Meteor*, impinged dazzlingly against the cabin of Mackington's plane. There was a red flare, a shower of fused glowing metal, and the doomed plane hurtled downward to destruction.

Florence cried out in horror, and Blake swore. The Radium Trust was ruthless in achieving its ends. Not only Mackington, but even their own pilots, had been murdered in cold blood.

Blake zoomed hastily upward, into the blanketing storm. Fortunately the *Meteor* had not seen him. Then he snapped on the invisible penetration beam. He swung it around until it caught and held the *Meteor* in its invisible light. An image sprang into life on the screen inset above the controls; Blake could now follow his antagonist's movements without his being aware that he was watched.

The *Meteor* leveled off, dipped suddenly for the plateau, swung sharply upward again. The pilot was not intent upon committing suicide. They achieved a five hundred foot level, circled slowly over the circumscribed plateau, obviously looking for a possible landing place. But there was none. The splintering needled rocks thrust wickedly up at every point. Even with the gyros to steady one's plane down, the lashing gale would inevitably dash it against jagged edges to destruction.

Three times the *Meteor* circled, then it seemed to give up the task. It soared to the thousand foot level, held poised against a backdrop of gray-white flakes. The plane seemed to be waiting for something.

Blake looked upward and understood. The storm was slackening in its force. Already there were rifts in the tumbled clouds overhead, stars swam into suddenly opened blue depths, swirled back into mist again. The sleet had ceased its drumming, the great soft flakes were thinning out. In half an hour the wind would have died, the sky become cloudless. Then the *Meteor* would discover their presence, machine-gun them out of existence. If there were anything to be done, it must be done now.

Blake turned, shook the girl's hand silently. She understood.

"I am ready," she said simply.

Blake dived until he was only a hundred feet above the upflung needles. Then he leveled, thrust out his gyrocopters. The great vanes whirled madly around, slackening his forward movement. Down they drifted; the sharp icy points seemed to lure them downward to destruction.

Florence closed her eyes shudderingly; Blake swung suddenly, hard. There was a sharp splintering crash, a jagged tooth ripped grindingly through the light steel wall of the cabin, and they were thrown violently.

Bruised, but otherwise unhurt, the two clambered to their feet, buried their heads in great fur *parkas*. The icy blasts were rushing into the cabin. Blake surveyed the damage hastily. The plane was pretty thoroughly wrecked; it would never fly again.

He grimaced; "We're in for it now. But first, let us stake out our claim."

He picked up the prepared notice of claim, boldly graven on a light steel plate affixed to a pointed steel rod, and with difficulty they opened the slide-port, clambered outside.

The fury of the gale was diminishing fast; tattered banners of the storm scudded high overhead. The poised *Meteor* was dimly visible.

Blake hammered the claim into the icy ground, took a swift glance upward.

"They'll be seeing us soon," he said grimly, "and then . . . ."

"What?" Florence asked bravely.

"They'll gun us out of existence the same as they did to Mackington, unless . . . . come in quickly, Florence."

He literally pushed the astonished girl into the wrecked cabin, where he worked feverishly at his radio controls. There was tense silence in the little cabin as he labored on; then:

"Thank God, it works."

He sent out his call on a directed beam: "Fairbanks. Fairbanks." Monotonously, over and over again. Ghastly minutes of waiting, with the ever present terror of the great plane overhead. Then finally, the signaled answer.

The pair sighed simultaneously. They had been near the snapping point. Fairbanks could send swift planes to help; the Record office would file their radioed claim. Blake explained to an astonished operator on the guarded beam. One half the mine to be donated to the government; one quarter each to Florence James and Harvey Blake, discoverers.

"We are wrecked," he ended. "Send swift armed planes for rescue. Bandits are attacking us."

"Right," came back the welcome answer.

Blake stopped sending, looked quizzically at the girl he loved.

"I'll tell you something later, when we have time," he promised. "The *Meteor* is due to pay us a visit any moment now."

They hastened outside. The plane was dropping for them out of the sky. The bulk of their plane had been discovered.

"I expected it," Blake shouted above the dying tumult of the storm. The hunted pair dashed through the wind-piled snow, floundered among drifts and jutting pinnacles until Blake dragged the panting girl suddenly downward. They were in the shelter of a great overhang, somewhat protected from icy blasts and prying eyes.

Even as they crouched, tracers of fire streaked downward, followed by the staccato rat-a-tat of machine guns. The wrecked plane gave a convulsive heave.

Blake smiled grimly. "We got out just in time. The Patrol from Fairbanks will be here in half an hour. The Radium Trust is about due for a final reckoning."

"And the plague-stricken world will have unlimited radium," the girl added softly.

THE END

FASHIONS IN UNIVERSES

Our readers who read the editorial "Wonders of the Universe" by Hugo Gernsback, the December issue, will be interested in the following, an editorial in the *N. Y. Times* of Sunday, November 6, 1932.

THE UNIVERSE CHANGES

"There is a Rue de la Paix where couturiers decide whether sleeves shall be fuller this year, and whether evening gowns shall be trimmed with fur or not. From the rapidity with which the universe changes its cut we might well infer that somewhere there must be a corresponding Rue de la Cosmogonie. Certainly we have had more styles in universes since relativity became the mode than the world knew from Pythagoras to the beginning of the century.

"With some difficulty we reconciled ourselves to the cylindrical universe of the Maison Einstein only to find ourselves helpless in its stays. If we raised so much as a finger, the whole crinoline of nebulae and stars collapsed. The fashionable Maison de Sitter proved to be equally unsatisfactory. It designed a crinoline without any regard for a body to fit it; for such is its space without matter. In the end the two conflicting Maisons merged and gave us the present expanding universe. But early this year Einstein, de Sitter et Cie. upset the whole Rue de la Cosmogonie by snipping out of their expanding universe its principal glory; in other words, its gorgeous lambda, its "cosmological constant," which was originally introduced by Einstein to satisfy an esthetic need, but which ended by making the universal crinoline expand. The crinoline is still curved, but whether the curve is convex or concave Einstein, de Sitter et Cie. are unable to say. They want more accurate measurements of the body that is to inhabit it, or, to use their jargon, more facts about "the density of matter."

"Thus stood the cosmic fashion as of March, 1932. Now comes conservative Professor E. A. Milne of Oxford with a cut that commends itself to old-fashioned views. He announces the startling discovery that the world is pretty much what we thought it was these many centuries. Curved, finite space, cosmic time, lambda—he sweeps away all such furbelows. The universe is like a compressed gas in a container from which the lid is removed, says he. Of course it starts to expand. Any system of bodies moving at random will behave thus. Into what does the universe seemingly expand? Into good old infinite space—the recognizable Euclidean space of yesterday's school geometry. We strut again in our old clothes. Like the boy in Andersen's fairy tale who saw the emperor marching by, not in the imaginary robes of flattery, but in the nightshirt of reality, Professor Milne creates a sensation by showing that the mathematical trappings of the universe are—well, just trappings.

"Of course, this is not the last word from the Rue de la Cosmogonie. Only the other day the Maison Einstein announced by way of the Prussian Academy of Sciences that we are to prepare ourselves for a new fashion. Since the Prussian Academy, like the Rue de la Paix, is not given to premature exhibitions for the benefit of the press, we must wait another month for the next universe. Meanwhile, we hold tight to Professor Milne's old-fashioned style."

(Illustration by Paul)

The planetoid was no longer under the ship. They were slipping away into the great vault of space. They were adrift.

THE MESSENGER FROM SPACE

By D. D. SHARP

● Our readers remember, no doubt, the exciting story, "Planetoid of Doom" in the last issue, based upon a newly discovered asteroid that comes within one million miles of the earth. The presence of such a celestial visitor must give rise to many speculations as to its nature, and its possible influence on the earth.

Mr. Sharp has built the present story around the same theme. His viewpoint however is very ingenious. He sees these space messengers as means of free transportation around the solar system; and if we can once cross one million miles of space to climb aboard the asteroid when it approaches us, it will carry us hundreds of millions of miles without the spending of any energy.

As may be expected, an unusual series of developments must proceed from the execution of that idea; and they occur in this story.

● A mysterious, cream colored ship appearing unannounced from space started Stephen Grinstead on the longest flight men have yet made into the void. The brief visit of the space craft excited a great deal of comment. It had alighted on the bare hilltop just west of the great Bird Airfields, but when a cavalcade of planes and autos swarmed out to the location, the vessel rose and departed as mysteriously as it had appeared.

For many weeks after there were widely varying comments upon this strange event.

Professor Meuse of an eastern University was of the opinion that the shp was a scouting war cruiser from the planet Mars, and that earth had best look well to her armament.

Dr. Fullerton, a cosmologist of note, gave the opinion that the ship was from the planetoid 1932-HA* which had just passed its perihelion and made its closest approach to earth. He believed that the crew were peaceful and were frightened away by the imposing array of armament at the Bird Fields. He surmised that they had taken flight to the moon to await the next passage of the planetoid.

At that time space flying was in the experimental stage. Flights to the moon were fairly commonplace, but there had been only two interplanetary attempts; one to Mars in 1986 and one to Venus in 1990. Both of these attempts had failed; and as late as May, 1998, no word had come from either ship, although helio stations throughout the world kept constant watch for the faintest signal from space.

Until a fuel more powerful than liquid oxygen could be invented, men hesitated about attempting any further flights to either of the near planets.

In actual experiments astro-navigators had found that many of the old theories regarding free motion in space must be discarded. First there was the pull of the sun to overcome. Any body traveling at less than twenty-five miles per second could not drive directly toward its objective without overcoming this orbital pull. Then there was the complicated maze of planetary gravitation as the ship found itself riding free from the earth pull. Also there was the factor of the counter explosion of fuel; the only known way to retard the tremendous velocities and allow them to enter the planetary atmosphere without burning up. This last named factor was experienced even on short flights to the moon when returning to earth. These were only a few of the major problems upon which daring space flyers were working when the cream-colored ship appeared.

That flight must have exceeded by many times, the distance that earlier earth flyers had successfully flown, and it offered a challenge that such men as Grinstead, Fullerton and Halsey could not ignore.

While armchair scientists pondered Fullerton's suggestion that the planetoid was the base of the amazing expedition; while they theorized and awaited developments that might result from the next passage of the planetoid, Grinstead's imagination took the spark like atomized gas. He blazed with a great idea. He believed that the planetoid was being used as a trolley to give the space ship a greater cruising radius. Since the orbit of 1932-HA crossed that of Earth, Venus, Mars, and the Asteroids, he reasoned that if creatures of another planet could make use of the trolley, men could also, and he immediately proposed an excursion to return the call of the occupants of the cream-colored ship.

He was fortunate in being the son of a wealthy banker, and in his choice of friends. He interested Fullerton and a number of other outstanding men of science. Within a month the third ship to attempt a flight to one of the planets, was under construction.

The new vessel was to be of the scouting type, equipped with every modern convenience and device to make the voyage safe and comfortable. Provision was made for a three year voyage, since the planetoid made the circuit of its orbit in a little more than twenty-one months, and the plan was to ride around it unless they could follow the cream-colored ship to its home.

In the hold of the vessel were built great flat electromagnets, for Hovendstadt had discovered that the planetoid was composed largely of iron and Grinstead wanted the magnets installed in order to help make contact with the metallic body.

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* Planetoid 1932-HA (now called Reinmuth) is no larger than Mt. Washington. It approaches the earth nearer than any other heavenly body except the moon.

Naturally such an expedition gathered its share of cranks and sight-seers. There were thousands of letters begging passage; offering small fortunes or seeking employment in any capacity, for the privilege of joining the crew. Grinstead was pestered night and day with telegrams, radiograms, visograms and bold personal calls.

● There was one strange looking man with a narrow distorted face, who hung around the shipyard almost every night. He never spoke to anyone and stayed within the shadow of the timbers, so that the neon lights never wholly revealed his features. He was somewhat stooped and the dark hollows below his cheeks suggested emaciation. In appearance he seemed harmless enough, yet Grinstead had a premonition that he was up to no good, and had him ousted from the yards.

A few nights after that, the hull of the ship was cut in two, so that the halves angled apart upon their supports. Below the cleavage the cement was ripped on a line with the slash. No one had any idea how the catastrophe had occurred. The guards had heard a great cracking and settling of the ship and that was all.

The damage was done, that much was sure, and yet it seemed impossible that such a thing could happen. With the most modern of machinery already in place against the ship; with Gorgon motors and terillium blades, that hull could not have been severed in less than half a month, for it was cast of the finest terillium steel. The fact was so astonishing as to seem fantastic.

The mishap was a staggering blow to Grinstead. For a while it seemed he would be delayed too much to make the flight in time for the next approach of the planetoid. But Grinstead was a determined man. When the flock of reporters and sight seers had been pushed beyond the gates, he ordered a shipment of hydro-oxygen welders by fast air express and in less than two weeks, instead of just begining a new keel, he had the plates securely welded together.

After that, he took rigid precautions to guard the work. He had the whole shipyard inclosed in a cave of steel. No one was allowed inside who did not have certified credentials. And when the ship was finally complete and tested, he had made a close record against time. There was but one day to spare before he must take off, if he was to have any hope of contacting the planetoid.

That night a small group of scientists came aboard. They were Clifford Rotan the chemist; H. A. Metcalf, the spectroscopist; Southey the biologist; Maisel the physicist; Fullerton, and Grinstead.

While Grinstead commanded the ship himself, he had been fortunate enough in securing Captain Halsey, the noted astro-navigator, for his first mate.

The hoists ran the ship to the head of its runway. The tackle fell away. The *Blue Bird* as the ship was christened, poised above the applauding multitude, which packed the streets and shipyards far below, and awaited majestically the discharge that would catapult her into the void.

Grinstead stepped from his office in the white uniform of a space pilot, just as the American flag was run up to the masthead. It fluttered to the breeze amid a roar of applause and Grinstead stood stiffly to salute it before he swung onto the manlift and was carried up to the ship entrance.

As Grinstead entered the vessel the hurrah and bedlam was stilled; he carefully examined the sealers, tested the air, glanced over the weather reports and looked at the barometer. Everything seemed in perfect order. He flashed the signal warning "take off," the light board cleared as he swung over the big brass control.

There was a shudder up the ship. A howling roar from stem to stern which could be heard even through the insulated walls, and he was flung incontinently into the elastic shock absorbing net at his back.

The first shock of the take-off over, Grinstead glanced down through the observation glass. Earth was falling, speeding away, apparently, into infinite space; the point of the *Blue Bird* glowed a cherry red, as he cut the control back a notch to avoid setting the vessel afire. Glancing at the friction gauge, Grinstead noted that the needle was moving away from the danger point. The air was becoming rarer; already they were in the stratosphere. He pushed up the control a notch and then another; the red glow faded from the bow of the ship, although the dials indicated increasing velocity.

At last they were off, gravitation was overcome!

● For the next two hundred hours Grinstead scarcely slept. Even a slight miscalculation during the initial period of flight would cause him to miss altogether that minute fragment of metal that was speeding toward the earth's orbit. A planet at that distance might not have been a difficult mark, but a three mile mass of iron was a different thing, especially when that iron was moving many miles per second toward the tangent of his course.

For long, long hours, (there were no days) a great, star-sprinkled void swung around the ship—the earth grew small and became a liquid star. Through those long hours Grinstead nursed the controls; up a notch, down a couple, until the red line of flight caught the dotted course on the chart. Then he stood for hours, like a frozen man, eyes glued to his telescope, or following the red-ink needle that indicated their position upon the chart.

It was the tenth day, according to the clock, when Metcalf came to him as he watched for the first glimpse of the planetoid.

Metcalf was a great, rawboned fellow, ugly as sin and one would have taken him, at first glance, for some backwood's rail splitter who had just cleaned up for Saturday night. But he had poise, an equanimity that was seldom upset, and an infinite capacity for achievement.

Grinstead saw at a glance that he had discovered something disturbing. He remembered that Metcalf had been airsick since the take off, but the bluish white pallor in the gaunt face suggested anxiety.

"What's wrong?" Grinstead demanded and again searched that sector of the sky where he expected the planetoid to appear.

"We had a stowaway," Metcalf growled grimly, "I knew you were having all you could handle. Halsey and I backed him into the storeroom beyond my cabin. This morning I heard the scream of air and found the air sealers had locked the storeroom door. The leak was a big one. The register showed vacuum. The poor devil must be dead."

A frown puckered Grinstead's brows. How had anyone managed to smuggle himself aboard the *Blue Bird?* Every workman had been checked in and out. Every entrance had been closely guarded.

But he had no time for Metcalf and the problem of a dead stowaway. Into the black void of sky, near that sector where the guide-hairs of the instrument crossed, floated a small, glittering speck. A mere dust atom swimming in a bath of sunlight.

"We've picked it up," he advised Metcalf quite calmly.

He took his eyes from the glass. Metcalf studied him intently. Calculations had indeed been accurate. Things were running smoothly, and as Grinstead returned to his glass Fullerton came from the manlift closet.

"We've picked it up," Metcalf rumbled. Fullerton slipped across the control room light as a cat.

The planetoid developed slowly. It became a pale star, then a tiny ragged moon. In an hour the orbits of ship and asteroid should converge.

Grinstead called Halsey in the power room. Everything was running smoothly. The next thirty minutes were given to tense waiting, and watching the planetoid develop slowly in the rear of the ship. As it grew quite close Grinstead stepped up his own velocity a couple of notches so the two speeds would be nearly equal. That seemed to be a signal for power-off. The red and green lights at the control box snapped out. All current in the ship was dead. Something had gone wrong!

"Locate it!" he shouted to Metcalf. "Have Halsey get the juice back if there's a ghost of a chance!"

Metcalf reached the manlift and realizing it was dead, swung out to the spider well.

With the power dead every minute brought the planetoid nearer. Every second cut down their chances of making contact. After several minutes Grinstead became impatient.

"Fullerton!" he commanded, "Take a look!"

Fullerton rushed off leaving Grinstead alone. The planetoid loomer nearer and nearer. He needed power if he was to pace it for descent. Without power, or magnetism, the planetoid would pass them at a tangent and leave them. Small as it was, it would soon be lost in space and without it to guide them they would have to turn back. To go on alone meant losing themselves in uncharted space.

Grinstead left the controls and raced down the hall. He caught the banisters of the spider stair and swung astride. He sped around and around like a flea down a corkscrew, and landed on his feet before the power room door.

CHAPTER II

The Strange Asteroid

● The lower hold was in darkness but he heard someone running up the spider stair as he reached the power room. Then, for a moment, he saw a figure silhouetted against the dim daylight in the upper hall. The man was slight of stature and stooped of shoulders. He was certainly not one of the crew and Grinstead recalled the old man who had hung around the rocket yard.

There was no time to follow him. Time meant power in the ship, and that power meant everything. The culprit could be captured later.

He wrenched open the door. The lights were out—the room was silent! The blade of a flashlight cut the darkness. It found Grinstead's face.

"This damned gas!" Fullerton gasped, "Metcalf's out clean."

Grinstead felt it too, scratching at his throat; making him woozy despite the open door. He flashed the dynamo switch. Relieved he saw that it was wide open, and so was the switch to the reserve batteries. He sliced them both in. Lights flooded the room.

Metcalf was coming to, clawing at his throat and propping himself up by an outspread hand. He blinked as one dazed.

The dynamos crackled and began their steady hum. Grinstead gave the room one searching glance. The three were alone.

That gas! It was peculiar stuff. No smell to it. But for the choking rasp of it in his throat and the drowsy, groggy feel of it in his head, there would be no warning.

"Keep the door open," he cautioned Fullerton, "but lock it when you come up. I must get contact!"

He wheeled and ran into the lower hall, and took the lift.

Again in the control room he looked out upon the small iron world that was swiftly approaching. It loomed a broken and desolate body, deep of canyons, ragged and studded with sharp peaks. He stepped up his power near its full limit. The planetoid seemed to halt in its race. For a while the two paced neck and neck, the great mass of grayish iron only a few thousand feet below the ship. The *Blue Bird* was almost atop of it, but the gravitation of the tiny world was not enough to bring them down.

Grinstead pulled the lever which cut the current into the electromagnets, thankful that he had had them installed. The *Blue Bird,* as though taken by a sudden breeze, drifted down. It spiraled to make one circuit of the planetoid. Grinstead then cut the gravity whirl of the vessel; the rotation of the ship slowly halted and he felt himself losing weight. Once more the *Blue Bird* spiraled the planetoid. It came to rest with a heavy crunch, but there was no noise. Grinstead knew as long as current ran through the magnets it would take a charge of explosive to loosen the *Blue Bird* from her perch.

A shout echoed throughout the vessel! Men rushed to portholes and gazed down upon the strange mountain of metal. They got into air suits and ventured forth upon the dark body of ore. They moved about very carefully, knowing that a quick step might send them soaring off into space.

The planetoid proved to be nearly pure metal. Its topography was sharp and rough. Behind the *Blue Bird* was a chasm of unimaginable depth. Nothing could be seen below the line of sunlight on the opposite wall. There was no air on 1932-HA and so of course the sunlight and shadow were both intense.

Outside the ship, talking had to be done by telephone. The soundless, airless, black and white iron world was disquieting, and most of the crew soon returned to the ship.

Grinstead remembered the stowaway. Unless that sector of the hull had been struck by a small meteor, he could think of nothing to cause a leak of air. He circled the vessel and halted below the window of the storeroom. It was fully twenty feet overhead, but owing to the slight gravitational pull, the jump was easy; the danger lay in leaping too far.

He sprang lightly and caught the rail of a catwalk that ran below the window. Upon the aluminum slats of the catwalk someone had left a fresh, damp track; in fact there were several of them. Someone had been moving about a good deal, leaving tracks, glistening green and metallic, as though they had walked through fresh paint. The tracks were not clear cut and distinct, only segments were left across the slats, but they seemed of varying sizes.

He wondered if some of the crew had been up there to peep at the stowaway. He peered in at the window. Lights were burning at every column of the wide, low room; but he could make out very little of what was inside. Objects were visible only under the full glow of light and there were no shadings to bring out depth and distance. He understood at once that there was no reflection of light because the room was void of air.

● There were other problems on Grinstead's mind so he dropped to the planetoid and glided around the ship. At the entrance he took the lift to the control room.

Fullerton and Metcalf were both there, taking advantage of the view from the observation nest. Vision was incomparably clear. The heavens bulged round and black from the narrow horizon of the planetoid. The stars were bright and dusted thickly down to the jagged skyline. The sun appeared as a white plate of dazzling brightness. He felt as though he were looking up into the dome of a vast and star-hung mosque.

"Is that water?" Metcalf queried as he drew near.

All three looked in the direction indicated by his outstretched arm.

"Of course it's not water," Metcalf corrected himself, "Any water that was ever on this planetoid would have been lost from it millions of years ago."

The three regarded the placid body of cool green. Certainly it looked like a lake of water. But none of them could reconcile it with any phenomena they might expect on the small body of ore.

So they sat theorizing, and as they talked there emerged from the shadow of an iron cliff, something that looked like a man bending over the pool of green.

"That's our stowaway!" Metcalf exclaimed, "He has donned one of the airsuits in the store room and left by the window! That accounts for the emergency seal!"

All three adjusted their binoculars.

"That's him all right," Metcalf affirmed. "Look at the hang of that airsuit!"

Grinstead scrutinized the man. The stoop of the body was evident even through the bulbous armor, and the grizzly hair upon the bare head inside the transparent helmet was not that of the well-groomed men aboard. He remembered the man climbing the spider well. And yet that man could not have been the stowaway for he was sealed inside the store room. At that time the ship was revolving* to give artificial gravity. The man would have been hurled into space had he attempted to follow the catwalk along the outside of the hull to the entrance of the ship.

"Have Halsey get a crew into air suits," Grinstead commanded. "Close in on that man, get him in irons at once!"

He was still in his air suit and he hurried to the man lift while Fullerton and Metcalf left to transmit his order.

Outside, he hurried down the slope; taking long chances he dived into a dark chasm. He fell slowly and touched lightly far below the line of shadow from the cliff. Night impenetrable enclosed him, a musty darkness.

He groped his way down the canyon toward a V of sunshine illuminating the basin. A slight push of his foot sent him soaring above the canyon floor. He touched a pinnacle of iron and was off again. He was getting the hang of the movement needed to make progress, but he had to be very careful not to go soaring out of the canyon to be lost in space.

He reached the basin. The stowaway was nowhere around. Of course there were no tracks on the iron floor, but there was a drip of the greenish fluid from the lake, and it was the same stuff that had formed the tracks upon the catwalk.

He unscrewed the little cup which covered the mouth of his water flask, and dipped it full of the liquid from the lake. He was surprised. The cupful of stuff had weight. Probably weighed a couple of pounds! By rights it should not have weighed that many grains on 1932-HA. A cup full of lead would hardly have weighed a gram!

He emptied the cup. The stuff poured and rolled like mercury. He could not catch it under the ball of his thumb.

In order to take a sample to the ship, he emptied the water from his flask; it straggled out in a long lazy rope; stretched like thick molasses because of the small gravitation. Yet the liquid metal from the lake poured quick and heavy as he filled his flask.

● He strapped the flask to its place at his belt. It dragged at its strap. It must have weighed all of twenty pounds. Now there was no longer any danger of ricochetting out into space, but he left the capture of the stowaway to his crew and boosted himself up the canyon wall. There were a thousand places a man could hide and the hunt might take a good deal of time. He was anxious for Rotan to give an opinion on the strange metal he had discovered.

He reached the ship wondering at his find. He knew there was no element in the table which compared to it for density. But he also knew that the only gaps left for fresh elements were those of high atomic weights. He could hardly conceive what that tugging flask really suggested. On earth it would weigh a hundred tons! Inconceivable! He knew the companion star of Sirius has a density of nearly a ton to the cubic inch!

Inside the *Blue Bird* again, he found a little group of men around a weazened old man they were taking from an air suit.

"We captured him, sir!" Halsey grinned as Grinstead stopped to view the stowaway.

As the group moved back, to make way for him, he saw that the fellow was already out of the air suit. He stood peering around like a cornered animal, bent of back as though his spinal column had become bowed from long habit of peeping through keyholes. His eyes were a skimmed milk blue, and the iris was eclipsed by large veined, pallid eyelids which bore no lashes. His features were angular, deep sunken, squeezed together; as though his maker, while the face was fresh from its mould, had bashed him over the head and slugged him under the chin. Over the dished chin was a growth of straggly beard, much like that of an ancient Chinaman or a very young wire-haired dog.

"What does he say?" Grinstead asked Halsey.

"He won't talk, or can't," Halsey answered. "The best he's done so far is to gurgle like an angry badger."

"I'll see about this later," Grinstead decided. "Where is Rotan?"

"In his laboratory, sir," an orderly replied.

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* The *Blue Bird* was cigar shaped and its rooms were arranged like a series of squirrel cages, making its floor the hull of the vessel, so that when it revolved centrifugal force caused artificial gravitation. The windows were sometimes in the floor, but in the control room and cabins they were in the walls, adjusted for convenience by the use of mirrors.

As he left the group he noticed that the stowaway's eyes were intent upon his flask. That flask was silver and gave no hint of what it contained. Had the old devil watched him fill it from the lake? Did that metal have any particular significance to him?

And yet there was something which seemed to lie heavy under that narrow skull, something mysterious like the metal in the flask.

Rotan was busy at a long porcelain table, scrutinizing something in a test tube, that he held high against the light.

Grinstead strode to the table, unscrewed the cork from the flask, and poured a tiny stream of the metal upon the porcelain.

Rotan stared at him through the frames of heavy gold spectacles, then at the substance inside the tube.

"Here's something to make your tubes dizzy!" Grinstead exclaimed.

Rotan took off his glasses and wiped them. He put them on again and then poked at the greenish metal on the table.

"Heft this!" Grinstead proffered the flask.

Rotan lifted the flask with a widening of his steel gray eyes.

"What is it?" he demanded. "Magnetic ore?"

"No," Grinstead objected, "It isn't magnetic. Look!" He opened his pocket knife and pressed it against the metal. It came away clean.

"Where did you get it?" Rotan demanded with growing interest.

"There's a whole lake of it down in the big basin. It acts a bit like mercury—Look!"

He segregated a little with his knife. It swelled into a greenish ball. It rolled uneasily here and there to come to rest against a far rim of the enamel.

CHAPTER III

A World Asunder

● Rotan's eyes were as serious as naked steel. He was a high-browed, heavily-bearded man. He looked like a surgeon, and the resemblance was emphasized by the white chemist's apron he wore. He pushed the metal about gingerly and flexed it with his thumb.

"You know," he said, "this seems to bear out my theory that the heaviest substance of a planet gravitates to the center as it condenses."

"In what way?" Grinstead demanded impatiently.

Rotan pointed his test tube solemnly.

"Just this," he continued, "1932-HA is one of a great company of asteroids which were formed by the breaking up of a planet which swung between the orbits of Jupiter and Mars. The largest number rotate about the sun at about the distance the planet would have taken according to Bode's law."

"Of course, Doctor," Grinstead interrupted. "But what do you think of the metal?"

Rotan frowned, but went on ponderously with his explanation, quite disregarding Grinstead's impatience.

"Since you have found a substance of this density clinging to 1932-HA it suggests to me that this planetoid is from near the center of the original planet. Don't you think?"

"You might be right," Grinstead agreed, "but the metal itself is staggering me. I want your analysis of it."

Rotan lifted the test tube he had been studying when Grinstead came in. He squinted at it and raised it between himself and the light.

"I can tell you more about your discovery a little later," he said rather absently, "I'll analyze it as closely as I can."

Grinstead saw he was not to get an opinion from him until the analysis was complete, so he left, intent on finding out more about the stowaway. He was beginning to believe it was the same man he had seen slinking about the shadows of the shipyard, and it also occurred to him that in the excitement when the ship was cut in two, the man might have entered the gap between the two halves of the hull, quite unnoticed. But what was his idea?

He crossed the sun deck on his way down the ship. Night had come suddenly upon that side of the planetoid. Metcalf's lanky form was draped over a deck rail near the windows, and he was staring into the great void which sheered off from every horizon of the ragged mountain of metal.

Metcalf's eyes became alert as he approached. His face was ash-grey and drawn, and his brows were knit as though he was badly worried. His long white hands were doubled upon each other in a violent clench. Something was evidently causing him deep concern.

"What is it?" Grinstead asked as he reached the spectroscopist.

Metcalf indicated his stateroom by a crook of a finger, and glided along the deck. Grinstead followed silently. They entered the hall and halted before the door of the store rooom. Metcalf pointed to the air register above the steel door. It was again normal, showing nearly fifteen pounds.

Grinstead reached out to open the door, but Metcalf clutched at him nervously and guided him to his own cabin. He was certainly not normal. He walked catlike as though wishing to make no noise, though the light gravitation would have rendered any step unheard. His eyes were bloodshot. Had the weird phenonema of infinite space unbalanced him? Grinstead had known men of iron to give way before the stark revelries of the empty heavens. Yet the pupils of Metcalf's eyes were large and black rather than small and bright. That indicated fear rather than insanity.

"I'm not myself," Metcalf whispered. "I've listened until my ears are ringing. There's something going on, Major. Something bad!"

Metcalf needed a bracer. Grinstead left him long enough to step to a small cabinet which was let into a panel between the port holes. As he passed he glanced casually at the iron world outside. He forgot Metcalf! He wheeled and lunged toward the door!

● The planetoid was no longer under the ship! It was slipping away toward the great vault of space. They were adrift. Evidently some one had cut off the current from the electromagnets and somehow managed to set the *Blue Bird* adrift.

He flung open the door. Leaped, or rather soared out to touch lightly at the opposite wall. He wanted current in those magnets, power in the engines. If the planetoid disappeared they would be left without a guide. Without power they would be like men dropped into the sea from a liner which sped on into the night.

Again he slid the bannisters of the spider stairs, reached the power room, where he found Fullerton and Rotan poking their flashes about the dark lower hall. The door was locked. They could raise no answer from within. Whoever had cut the power was making sure it would not be turned on again until the planetoid was gone.

Grinstead jerked an ax from an emergency case. He might as well batter at a steel vault with a rubber balloon.

"The stowaway!" Rotan swore roundly, "Dodged in there. Locked the door before we could reach it!"

Grinstead threw down the useless axe and went into the tool room. There he found an oxy-acetylene torch and soared back. It was but the work of a few minutes to cut off the hinges, and pry off the door.

The power room was silent as death. No dynamo hummed. No pump throbbed. Grinstead played his light around the room. It disclosed the sprawled body of an engineer, whose brains were oozing out from a horribly smashed skull.

That was puzzling. An axe, with the gravity rotation off, would not have dented a man's skull.

He sliced in the switches which started the engines. Power was needed at once if the planetoid was not to be lost.

With the machinery working again, he hurried to the controls. The planetoid was still drifting away from them; the ship's magnets were no longer attracted by it, the rockets must be started immediately.

He cut in a charge. Not wanting to contact too violently he only gave her a couple of notches. The *Blue Bird* responded gallantly. The planetoid grew steadily in size.

Then something rose beyond the jagged horizon of the planetoid. It was small and of a creamy color. Grinstead grabbed his binoculars in amazement.

It *was* the mysterious space ship that had visited the earth! It had been on the planetoid, and now it was leaving, moving swiftly, so swiftly he could not hope to overtake it. Grinstead knew they were moving toward the sun.

He drove the *Blue Bird* on, undecided whether he would give chase to the ship or await a nearer approach to the earth.

A minute later it seemed as though lightning hit the planetoid. The iron mountain swelled and burst into an explosive belch of metallic splinters, scarifiing the hull of the *Blue Bird* although she was miles away.

The swarm of slugs winged wide, however, sailing off in an unending explosion. Rushing with unimpeded velocity like a miniature demonstration of an exploding universe.

At the first warning Grinstead swung his guide lever full about, to wheel from the wreckage. But the *Blue Bird* did not respond. The guide lever slid back and forth without resistance. It had lost control. Grinstead shut off power but did not cut in the gases in the head of the vessel which were a counter propellent to cut down velocity. The exploding wreckage was already far out in the widening wave of the new and miniature universe. Only sluggish iron dust and stray particles hovered over the place where the planetoid had been.

He cut the useless current from the magnets. They would be collecting a mass of debris against the bottom of the ship. Then he called Halsey by phone and ordered a crew to trace the break in the rudder control.

● The rudder itself was a giant flake of terillium, which swung left or right against the gas explosion to alter the course. Even as Grinstead phoned he saw the great fin-like flake rise slowly beyond the observing window.

"No use, Halsey," he called, as it disappeared overhead, "The rudder's gone!"

The dead weight of despair was in his heart. Hope was fusing and paralyzing his nerves. He stared into the emptiness which engulfed the ship. They were adrift in a rudderless ship, floating helplessly to apparent destruction.

Slowly the metal fin rose past the window again. It had circled the ship. But all hope of retrieving and repairing the rudder left Grinstead's mind as he watched it make another orbit of the ship. It was broken square across, and the ribbons and slugs of nickel and iron from the explosion had shattered it beyond possible repair.

For a moment he sat rigidly studying the heavens. He would not give up the fight without a struggle, though the seal seemed set upon the doom of his vessel. He had to think—*to think!*

He looked at the instrument board. The velocity was inaccurately shown, of course, with no near planet to deflect the needle, but it seemed to have somewhat accelerated since the explosion of the planetoid. Something was tugging at them. He glanced at the heavens again, trying to figure which planet was influencing his speed. Jupiter was brilliant. Mars was equally large with its peculiar reddish cast more discernible here in the void. Earth seemed much smaller and more alien than either of the other two. It hung against the black sky near the white disc of a dazzling sun.

He wondered if there were a possibility of helioing the earth. No communication had taken place for several days. On sober consideration he abandoned the idea as impossible. No astroship could locate them in the void, and there was little chance of its making the return journey if it did. Probably the *Blue Bird* was following fairly closely the old orbit of 1932-HA, and would follow it for some months to come around the sun. It should at least pass around the sun and finally reach the aphelion of the planetoid's orbit. It might even drift into the clutch of the giant gravitation of Jupiter. No earth vessel yet constructed had a chance of making the rescue even if anyone were willing to take the risk, and there was a chance of getting a message across.

Rotan came in. He had the flask of greenish metal.

"This killed the engineer," he said grimly, indicating a blood smear. Thank God that maniac shoved us off before he blew the planetoid!"

"Can't see we're so well off," Grinstead objected grimly. "More than that, I am puzzled as to why they cut us away."

"They?" Rotan inflected a question.

"Yes, they. The cream colored ship took off just before the explosion. Must have smuggled their man aboard for some purpose. I can't understand it all yet. It's quite plain they are afraid of us. They probably have been since they found an earth filled with cannon, whodows, and death rays! Now they blow up the trolley to forestall an invasion, but why did they spare the *Blue Bird?* If they hadn't cut us adrift we'd be in kingdom come right now. I really don't know whether to hang a medal or slip a noose on the man in our hold!"

"You wanted to know something about this metal?" Rotan deliberately sidetracked the all absorbing problem now upon Grinstead's mind.

Grinstead stared through the window and frowned, but Rotan went ahead.

"I have called the new substance HA-X until you give it a name. That's your privilege, Captain. A great privilege! It will open a vast field for investigation, the metal I mean. Its density, ah, what a density! More than the ionization of atoms. Something new, intriguing. There is an energy pulsation toward the substance which suggests a condensation of cosmic ray energy. Not a ray, you understand, nothing that is caused by the breaking up of atoms, but something which comes from the building up of them. If we ever have the good fortune to get foot on earth again, this metal will be the most valuable substance known to the scientific world!"

"Doctor," Grinstead interjected, "You are hard to hold down when your mind wants to proceed. Yesterday I was excited about this metal and you scarcely gave me a word. Now I am anxious about my ship. Present indications are that we may have years in which to talk of HA-X. Please don't think me too abrupt."

He lifted the phone and called Halsey.

"Halsey? Give a general OY and have deck guns mounted for immediate action."

CHAPTER IV

Adrift!

● Rotan was near the door when he hung up the phone.

"There's nothing like action to steady one's mind," Rotan smiled.

Someone has said that the extreme emptiness of space might be suggested by six specks of dust afloat in Waterloo Station. And, when it is remembered that those specks of dust are worlds, and not space ships, one may grasp some idea of the plight of the *Blue Bird*, crippled as she was, swinging around the great orbit in which she was marooned.

Yet dauntlessly Grinstead set himself to the task of cheating the inexorable. With no idea of how any ship might flounder across that staggering gulf, he went methodically about finding some plan that might afford a solution.

And as he sat prodding his baffled wits, the door of the control room clicked open behind him. Thinking it was Rotan he sat stolidly gazing into space, and then he heard the clop, clop of shoes upon the floor. He wheeled, leaped to his almost weightless feet, and found himself bounding against the ceiling.

He had set the gravity rotation very slow to save fuel. They would need it in all the isolated years ahead. Need it to drive back the intense cold of space. The sound of shod feet had startled him, where men walked light as angels or ghosts. And turning he saw the stowaway pounce through the open door, and then to his stark amazement another grizzly fellow followed on the heels of the first. Behind were a dozen more. He could see across the hall into the store room where the door was wide open. Men were piling out of the long rows of metal airsuits which had been stored atop cases of goods.

They leaped down and ran to join those already in the hall. He could hear their feet pounding upon the terillium floor, a heavy clopping which suggested unusual weight. *Their shoes were soaked with the greenish metal from the lake!*

Their eyes were narrow and murderous. They seemed certain of victory though their only weapons were beverage bottles they must have obtained from the refuse dumped from the *Blue Bird*.

This attack cleared up a lot of puzzles in Grinstead's mind. The owners of the creamy craft had known that the *Blue Bird* intended using the planetoid, and fearing an invasion of its home planet from a belligerent earth, had severed the hull of the *Blue Bird* by running a stream of the green metal across it from a great height. Then when Grinstead was still determined to make the trip, the stowaway had been smuggled aboard to open the port to the attack. It was now easy to understand the mystery of the severed hull. That green metal, dropped from any great height would hardly have stopped short of the center of the earth, and would have left no trail. It was now also easy to understand why the *Blue Bird* had not been blown up with the planetoid. She would make a whale of a trophy.

Yet, plain as the solutions were now, they did not help Grinstead, for the enemy was in the room in great strength, and he had only an officer's automatic, loaded with a single clip.

He slid to the floor from the table where he had settled from his flight to the ceiling. Grasping an iron stool he found it light as paper. Not wanting to use his shells until the situation became desperate, he swung the chair between him and his nearest assailant. A furious wallop from a hurled bottle caught him beside the head. Had gravitation been on he would have been killed. As it was he was almost as light as the air inside the room. He weighed about as much as a pair of rubber balloons, and the blow against his head had the effect of striking one. He bounded to the ceiling scarce feeling the blow. But it gave him a warning. *The bottle was loaded with the green metal!*

He grabbed his gun as the horde closed in. He might not come off so lucky next time. If the improvised billies caught him against a pillar or near the wall, his head would burst with half the force.

He fired. A man went down with a bullet through his head, but the rush came on without hesitation. They seemed determined to pay whatever price was necessary to capture him.

Grinstead stopped firing. He reserved his strength. His nerves, always cool, well oiled and steady, made him capable of retaining his high cards for a crisis.

● Disregarding consequences, he caught a handhold beside the window and swung himself to the control board. He pulled down the lever of the siren box which would warn the entire ship of danger. He followed that by an attempt to talk to Halsey by phone, but the wiry invaders were upon him, clawing him away, raising their bottles for the finishing blow.

His swoop to the control board gave him a hint. The weights the enemy carried made them somewhat slower of motion. He pushed hard against the table and found himself again at the ceiling. A bottle banged close to his head. That wouldn't do. Safety lay in tangling with the mob.

Fullerton burst into the room. A dozen space men tackled him and swung him down like leopards bent upon a kill. The mass was over him, but he came up fighting, tooth and nail, trying with paper blows to beat off the attack. He got to his knees, his red hair bristling like a pit bull beset by mongrels in a strange alley. His freckled jaws were lean and tight.

Grinstead admired his valor and pushed down to his rescue. He was sorry Fullerton had come up. He hadn't the strength for such a fight, though his nerve *was* inspiring.

Struggling through the melée, he pried the devils from Fullerton's back. There was a crackle and tinkle of broken glass upon the post beside him. Green metal spattered against a far wall.

Grinstead dodged. He had forgotten he was near a pillar. The broken bottle was up again, coming down to his head. The cup of it held enough metal to give it weight.

He dove but the ragged glass slashed across his forehead. Blood welled up to ooze into his eyes.

He resorted to his gun. He was in a jam. Fullerton was down again. He emptied the chamber into the nearest of the pack. The recoil shook thick blood into his eyes. He was loaded with the devils. They dragged him toward a clear space for a knockout blow.

Halsey and his mates came cursing from the hold. They threw themselves into the fight, but it was impossible for them to use their guns. The crew of the *Blue Bird* shielded those attacking them.

"Gravity!" Grinstead shouted, "One of you near the controls!"

But every man was assaulted, fighting for his life. The invaders battered, clawed, bit, and kicked with their leaded shoes.

Through a red blurr of blood, Grinstead saw that Fullerton was about done. Fullerton was his crony, his pal. He couldn't let them murder him!

Like an angry bull he shook the blood from his eyes. Like a charging lion he vaulted from the claws of the pack, and half blinded with blood, fought his way to the gravity control. Without gravity the bludgeons of the crew were useless. With it he might hope for a more even fight.

More by instinct than sight he reached the lever and pulled it flat to the boards. How much weight that was he didn't know. He had never tried it out. Three quarters down was earth gravitation. This would give more, much more, and he wanted it. He wanted heft in the iron stool he grasped from its place before the control board. He wanted weight in pistol butts and switch controls which some of the crew were handling.

He heard Fullerton cursing, a smothered defeated curse. He saw the squeezed features of a space man, mouth open, teeth set, and he strained to wrench loose the bottle which would murder him. He heard Southey scream.

Rotan burst into the room like a bellowing ox. The silver flask caught the grinning murderer across the head and lifted him clear of Fullerton. The man dropped in a struggling heap. The flask with terrific momentum landed against the far wall and dropped to the control table.

Gravity was coming. Grinstead felt the take of it in his body. The invaders were having trouble in swinging their clubs.

Southey was down, covered so that only his tan puttees identified him. Grinstead brought his stool down viciously upon the devils who choked him. It had a heft, small to be sure but enough to waken a response from the men killing Southey. A bottle dropped on Maisel with an impact that crushed him. Another bottle jarred the floor. The green metal was becoming a hellish menace. He wondered if he had not turned certain victory to the invaders by rendering their weapons more disastrous. Could he fight back to shut off the gravity switch? What matter,—either way it seemed the *Blue Bird* would certainly be scuttled.

But Grinstead was determined to fight to the last. "No quarter!" was the battle cry.

● Without let, nor pause for breath, Grinstead clubbed with his stool and it began to jar the grizzled heads it encountered. He dodged shattered glass from the bottles which were banging against the floor. That gave a hope. The metal was getting too heavy for the strength of the glass. But the painted shoes of the space men were kicking as strong as ever.

Then Grinstead noticed an awkwardness in the space men. They could not lift the remaining bottles. They shuffled rather than lifted their feet. There was one who stood rooted and did not seem to be able to move. Then another stood like a pawn on a chess board, if a pawn could squirm, and struggled to get off its square. There were some who lay sprawled and done for by Grinstead and his crew, and there were some of the gallant defenders who lay sprawled and inert.

But weight was coming with each faster revolution of the rotators; and as weight came the crew found it easier to evade and to beset the invader.

A spasmodic crackling shook the whole room. Grinstead was amazed to see the silver flask at the apex of an outward bulge of the strong terillium. Immediately he remembered the possible weight of that flask, and he became the calm commander again.

"All hands to the outer hall!" he ordered, "And make it snappy!" he cried out as another spasm followed the first.

The crew abandoned the fight and obeyed. The space men struggled but could not even shuffle along the floor. Their metallic soles were getting tremendously heavy. The rotators were rapidly accelerating.

Grinstead followed the crew and closed the terillium door to the control room. Through the transparent panel he saw Halsey clutched by one of the rooted space men. Halsey had not been able to break away.

Grinstead flung open the door, and closed it again so that the crew would be safe from the danger that threatened. He reached Halsey, and beat loose the hold of the invader.

The whole floor of the control room was vibrating and giving as he ran back across the room with Halsey in his arms. The door opened for him, and he lunged through. The door slammed, the sealers were set, and the battered and wounded crew pressing against the transparent panel of the terillium witnessed an amazing thing.

The green metal ripped through the plates of the *Blue Bird* to make a sieve of the control room floor. There was a screaming and howling of escaping air and far down in the hold of the *Blue Bird* could be heard the screaming of air and the banging of automatic doors which sealed the stricken part of the vessel from the rest of it. The unhappy invaders in the control room, unable to shed their metal shoes, were dragged after the escaping metal, forced through the narrow breaks like forced fed sausage meat.

The battle over, wounds were dressed and men washed the blood from each other's backs.

"What chance of making it to earth?" an orderly asked as he raised himself, on an elbow, from his cot.

"I wish I could say there was a chance," Grinstead growled, "but the *Blue Bird* couldn't cross the strait between the moon and earth in the shape she's in. Of course if we were anywhere near the moon, or even in the earth's orbit, we could helio for assistance. Here that is impossible. And moreover we are moving away from our own planet at the rate of more than twenty miles a second!"

"Can't we slow down?" the boy demanded, "Why go any further away?"

Grinstead laughed a bit ironically. "You're about like the little man who was badly frightened when he heard the ocean under him was a mile deep. What's a few million miles, more or less, between earth and the asteroids? I'm saving our fuel to prolong our lives, hoping we may yet drift to some planet.

"You see we're sailing blind. A good deal like an old time sailing vessel caught in strange currents, beaten by the wind, its rudder lost and the ocean stretched out to a thousand times its size."

"I'd like it better if we slowed up and didn't get any further from our good old earth," the orderly insisted and reached under his pillow for a packet of cigarettes.

"If we slowed up too much we'd flop into the sun," Fullerton said cheerily.

● Grinstead clenched his hands. His whole face was so stricken that Fullerton noticed it.

"What's wrong?" he demanded and moved feebly to put out a bloodstained hand.

"Not a thing!" Grinstead fairly shouted. Despite sore muscles and aching bones he ran to the manlift and dropped to the power room where he could alter the power of the ship.

Fullerton, Halsey, and a few of the crew followed him. It was plain they believed he had cracked under the strain, But Grinstead soon disabused them.

"Fullerton, that last remark set my brain to ticking. We can slow down, and when we do we will swing in the orbit of our own earth, within ten million miles of home."

"I don't just get you?" Halsey interjected.

Grinstead's hand was already on the reverse lever, opening a charge of repelling explosions from the head of the ship.

"We not only can," he emphasized after a while, "But when our velocity is steadied at 18.6 miles per second we are bound to swing around the sun in the exact orbit of our own Earth. It is immutable natural law!"

Very slowly, like the hand of a clock, the indicator turned back from more than twenty miles per second until it reached 18.6. There Grinstead set the automatic control, for that was the velocity of earth, as it moves in its orbit around the sun.

Fullerton was staring at the indicator and there was a relaxation in the tense muscles of his freckled face.

"I get you," he said slangily, and stretched his tired body across a table.

"Get what?" demanded the trembling orderly as he slumped through the door. "Are we still lost or am I plain cuckoo?"

"We're safe!" Grinstead wiped beads of sweat from his face. "We'll pick up earth in less than a year, at most."

"How?" the orderly was not satisfied, "Not an hour ago you said we were totally lost? Have you found your compass?"

"That's just what!" Grinstead agreed. "Your talking of slowing solved the problem. You understand the size of the orbit of any body traveling around the sun depends on its velocity. The greater the velocity the greater the orbit and vice versa. It is the balancing of centrifugal force against the sun's gravitation.

"If we slow up enough, we fall into the sun. Slowing to 18.6 miles per second, we fall into the orbit of the earth, and since we are parallel to it, only much further out, we'll soon find ourselves within helio distance of our own mother earth. Simple, isn't it? Simple as are all Nature's laws when one understands them!"

THE END.

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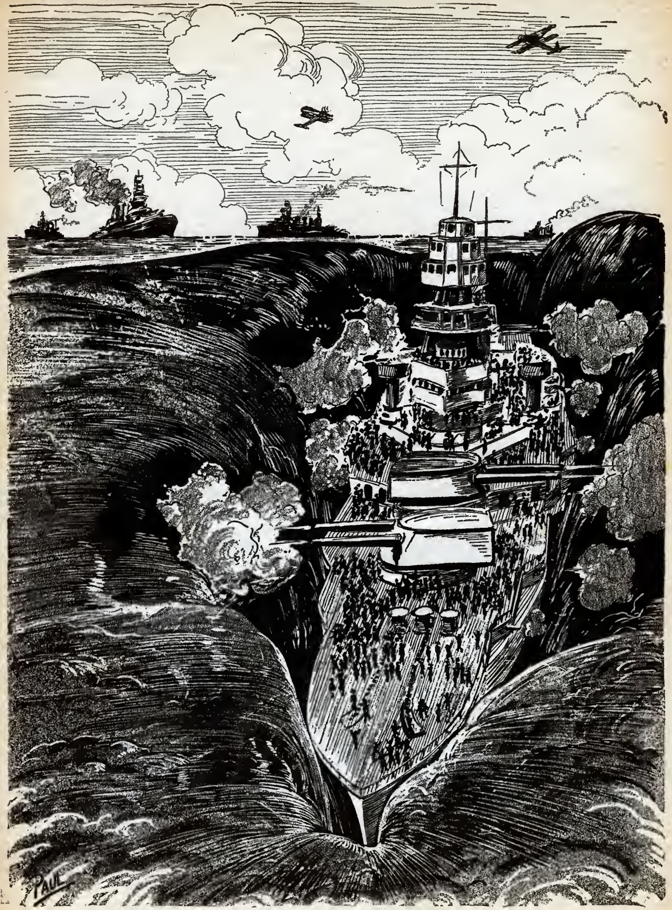

(Illustration by Paul)

The edges of grey stole slowly but steadily up the Invincible's sides, making ready to engulf her. The ship was being drawn into a huge pocket of flesh.

THE SYNTHETIC ENTITY

By CAPTAIN S. P. MEEK

● It has been said that life forms now on earth exist by a sort of mutual tolerance that has created a balance of nature. If this does not exist and certain life forms got out of control, they would continue to grow until either they had absorbed all of the available food or until extraneous forces killed them off.

The question of food, however, is of the most importance. The descendants of a single oyster, it has been said, if they continued to reproduce at their normal rate would soon weigh more than the whole earth... A lack of food soon puts a stop to their growth, however.

In this story we have an engaging recounting of what might happen when a life form gets out of control. Our readers might well ponder how they would have killed it off, had one of them been the unhappy Erasmus Van Hooten.

Author's Note: The first part of this narrative was reconstructed from the notes and diary of the late Erasmus Van Hooten, Ph.D., which are now in my possession. The latter part of the story was told to me by Dr. Chang Yen Tong of the University of Pekin (to whom I am also indebted for the notes and diary above mentioned) in compliance with the last request of Dr. Van Hooten that his story be given to the world. Dr. Chang has read the completed manuscript and he states that it contains no inaccuracies of fact, so far as his knowledge holds. He assumes no responsibility for the accuracy of the motives imputed by the author to Dr. Van Hooten for his actions in concealing the fact of his momentous discovery from the world for so many years.—Shanghai, China, February 3rd, 1940.

● Erasmus Van Hooten readjusted his microscope with meticulous care, his hands trembling despite his efforts to remain calm. He gazed through the instrument, then raised his head, great beads of sweat standing out on his high forehead.

"God in Heaven!" he muttered.

Once more he bent his head and applied his eye to the instrument. He sat back in his chair, suddenly weak with emotion.

"It lives," he said in a strangled voice. "It is a success at last, success after ten long years." His strong hands with their tapering, delicate fingers trembled so that he could not control them. For a few moments everything seemed to swim about before him, the laboratory tables and pieces of delicate apparatus describing weird circles and figure eights before his gaze.

"It lives," he muttered again to himself. "God in Heaven, *it lives!*"

His voice rose almost to a shriek on the last words. He recovered his composure with a superhuman effort, forced himself to regain some of his usual attitude of detached calmness.

"I must be calm," he told himself sternly. "It must be a mistake, an optical illusion."

There was good reason for his emotion. Where, a few days before, there had been under his microscope merely a pinch of soot, a few drops of distilled water and traces of other inorganic, lifeless materials, now there was exhibited to his astounded gaze, *living tissue!* Mere pinpoints of matter they were, simple amoeba-like cells, but they were alive. Erasmus Van Hooten, after ten years of slow, patient effort, had succeeded in synthesizing life.

He rubbed his eyes, regained control of himself and looked again through the microscope with a skeptic's gaze. But skepticism vanished before what he saw. There was no doubt that his first observation had been a correct one. The cells were living, growing. Absorbing nourishment, digesting it, increasing in size. Before his eyes cells were dividing to form new ones. His head swam and a black pall, flecked with brilliant spots of dancing light, passed for a moment before his eyes. He had become inured to years of disappointment, but for a moment it seemed that success would prove fatal. The spell passed. Van Hooten was galvanized into sudden activity.

"They must not die now," he cried.

With hands that trembled despite his efforts, he picked up a bottle of synthesized protein solution which he had prepared long before. He took a drop of it on the end of a needle and applied it to the microscope slide, then looked again. The activity had increased. Evidently the rate of growth of the cellular material depended upon the available supply of nourishment.

So interested was Van Hooten in watching the growth of his creation and seeing that the tiny cells were properly and abundantly fed, that all thought of nourishment and rest for himself vanished from his mind. For forty-eight hours he remained in his laboratory, his eyes glued to the lens of his microscope. Gradually the tiny bits of tissue grew until they approached one another on the slide. They touched. To Van Hooten's great amazement, the various bits grew together until there was but one solid mass of tissue, roughly globular in shape, on the slide.

Then tired Nature asserted herself. Van Hooten knew that he could go on no longer. His red-rimmed eyes could not see, nor his hands, trembling from weariness, perform. With an effort he picked up the precious morsel of tissue and slipped it into a tube of sterile protein solution. Hardly had he completed his task than his eyes closed. He managed to grope his way to a couch in the anteroom and fall onto it, to lie in a stupor of sleep for twenty hours.

He awoke ravenously hungry, but his first thought was for his tissue. It was still living and was growing regularly, although slowly. He tore himself away from the laboratory long enough to get a meal, then threw himself again on the couch for another six hours of sleep. He awoke in a more rational condition.

"I have done it," he said to himself as he studied the steadily growing tissue through his instrument, "but no one will believe. They will say that my materials or my apparatus was not sterile, was not devoid of life when I began. I must repeat the experiment, not once, but many, many times before I tell anyone of it. Also I must study the substance and find out all I can about it. I must have such proof as will silence all scoffers before I announce it to the world."

● Poor Van Hooten! Little he realized then the dramatic form in which the announcement would finally be made.

Luckily he was in a position to do as he wished. A discovery of commercial importance had made him a rich man ten years before and he had promptly resigned a professorial chair in Columbia University and devoted his life to chemical research, following the will o' the wisp of synthetic life. A bachelor, no domestic arrangements needed to interfere with the long and steady hours he wished to spend in his small but completely equipped laboratory. He threw himself heart and soul into his work.

Time and again he repeated his experiment, always with the same result. His method was positive. Each bit of tissue he created was added to the first mass, increasing its size. He learned many things about his creation. His first observation, that the rate of growth was dependent upon the supply of nourishment, was verified by subsequent experiments. By starving the mass, the rate of growth could be retarded, made very slow. By supplying an abundance of readily assimilable protein, the tissue could be forced to a maximum rate of growth of ten per cent of its diameter in a week, doubling its diameter and increasing in mass eight-fold in about two months.

"Now I can safely experiment," he said when the mass had grown to the size of a pea, "and learn more about the characteristics. There is no danger of my supply failing, I can repeat my experiment at will."

He took a sharp knife and delicately detached a portion of the mass of tissue. The cut portion he slipped into a sterile protein solution.

"Doubtless the cut-off portion will die," he murmured, "and possibly the whole mass will cease to live, yet the experiment is a vital one. We shall see, we shall see."

His fears were unfounded. Both portions of the tissue thrived and grew. When he placed them in contiguity they joined together again into one ball of flesh, the scar of union disappearing in a few days.

The cells would feed on almost anything. Synthetic protein was replaced by natural protein, by carbohydrates, by fats, and still the tissue continued to grow. Even inorganic materials would be absorbed and a certain amount assimilated, the rest cast aside. The mass grew until it was as large as an egg. Still Van Hooten could not bring himself to announce his discovery. Naturally shy, perhaps he feared the jeers with which such an announcement would be greeted.

More probably the joy of such a secret knowledge, the fact of being the first to create life, was a pleasure which his nature, possessed by a pronounced inferiority complex, could not forego. It is possible that some lingering spark of caution sounded a warning note in his ear. No one could foresee what the results of such a discovery might be.

One day as he was watching the steady growth of the mass, a luckless fly lighted on it. Van Hooten started to brush it away, then sat forward, unable to believe his own eyes.

"God in Heaven!" he cried.

The surface of the tissue globule was sinking as though the insect's tiny weight were forcing it down. It sank slowly until the fly was in a pocket. With a sudden movement that was almost a snap, the pocket closed. The fly was a prisoner. Fascinated, Van Hooten watched the process go on. The fly was gradually absorbed into the mass, leaving only a slightly darkened area which faded out in two days.

"It can feed on living tissues," he decided. "This opens a new avenue of experimentation."

He tried the thing with larger insects, with bits of animal and of vegetable matter. They were all readily absorbed. The thing was omnivorous. His experiments took months and all the while the mass grew steadily larger. Van Hooten even thought that he could detect signs of incipient organs forming. At least, it was evident that all the cells were not identical as they had been at first, but were differentiating between themselves. And still the mass grew.

It had grown to be a foot in diameter before its creator realized its true nature. One day while working with the mass he carelessly rested his hand on it. The surface sank beneath its weight. He allowed his hand to follow down for a few inches before he strove to lift it. When he did so there was a sudden movement. In an instant his hand was caught, imprisoned in the mass.

He strove to withdraw his hand but the thing held him with a death grip. He placed his other hand against it to exert more pressure, but the sinking of the surface warned him. He withdrew his free hand hastily, just in time to keep it from being caught in another pocket.

Suddenly a fierce burning pain ran up his arm. He stared into the semi-transparent mass, saw blood oozing from his hand into it. The skin had already been absorbed. He lifted the sphere of flesh and swung his arm, but he could not free himself. His eye fell on a heavy knife. In a few moments he had hacked out a gobbet of tissue, in the midst of which was his skinned hand.

The cut surface began to glaze over. It was a matter of seconds for Van Hooten to slice off the material until he had left only a thin layer which he could peel off his hand. He tossed the detached portion back onto the parent mass to which they soon attached themselves.

His crippled hand kept him from the laboratory for a week. When he reentered it, he stopped aghast at the growth which had taken place. Measurements soon told him that the increase was normal, but now that he realized the malignant nature of the thing, it looked huge. He was thoroughly frightened.

● "What will the end be?" he cried as he stared at the steadily growing mass. "In time it will be as large as a house and will catch and absorb all life that comes near it. Eventually it will be as large as . . . ."

His brain reeled at the possibilities.

"It is a Frankenstein!" he cried. "I must destroy it before . . ."

Again his brain refused to contemplate the possible eventualities of his great experiment. He stubbornly put down his incipient panic and set his mind to consider ways of destruction.

"Cutting it up will do no good," he mused. "The thing has no brain, no nervous system. It is simply flesh, vibrant with life. I cannot starve it for I had found portions able to lie dormant for months, then resume growth when nourishment was furnished. I will poison it."

It took him only a short time to improvise a gigantic hypodermic syringe from a piece of glass tubing and a bicycle pump. With his apparatus he injected a quart of potassium cyanide solution into the tissue. He left the syringe in place and went to bed, fully expecting to find dead flesh when he awoke.

"God in Heaven!" he cried in dismay the next morning. Not only was the thing still alive; it had drawn the pump into itself and had absorbed the rubber parts. It thrived on cyanide.

Nor were the other poisons more effective. After pouring pounds and gallons of the deadliest toxins known into it, the only result was that it still grew steadily.

"What a fool I have been to waste my time!" he cried to himself when he found that phenol merely accelerated the growth. "I have been merely supplying it with food. I must attack it from the outside. It is tissue, and tissue will not withstand heat. I will burn it."

His laboratory was a detached concrete building he had erected for the purpose. He carried firewood into the room and heaped it about the malignant mass which now reposed in the center of the room. He soaked the wood with kerosene and lighted it, then backed away from the inferno of flame which resulted.

When he entered the room hours later he found a black, charred mass where his tissue had been. The black was iron hard. Under blows from a chisel, hard carbon particles flaked off, revealing only more carbon deeper. Van Hooten wiped his brow in relief. He suddenly felt years younger. The menace was gone.

His jubilation lasted but a few hours. At the end of that time the carbon shell had cracked open in a dozen seams, revealing the fact that it was less than half an inch thick. Through the cracks he could see the flesh, still living and still growing. He sank down, his head in a whirl. His last resource was exhausted.

He stood a few minutes in a daze, then shook his head, a look of determination on his face.

"No thing is greater than its creator!" he cried. "There must be a solution."

His mind worked furiously, but in the end he came back to the same sickening conclusion which had assailed him when he first found that fire was ineffective. The thing was indestructible, eternal. It could not be cut up, poisoned, burned or starved. He was at his wit's end when inspiration visited him. He hastened from the laboratory and returned in a few minutes, leading a stray dog.

"Can it be digested?" he asked himself as he cut off a portion of the flesh and offered it to the hungry mongrel. The dog sniffed, then turned from the proferred food in disgust. Van Hooten groaned, but he was not yet defeated.

"Dogs are not omnivorous," he said to himself, "but there are other things that are. Fish will eat almost anything."

He left the laboratory again to return with a bowl of goldfish. He minced up a bit of the tissue and dropped it into the bowl. To his joy, the fish gobbled it down with avidity.

"Now, will they digest it . . . or will it digest them?" he muttered.

There was only one way to solve the problem, to wait and watch. He watched anxiously. And meanwhile the mass grew larger daily.

In a month he breathed freely again. The fish throve on the bits of tissue he fed them daily. The way to destroy the thing he had created was open to him at last. There were not enough goldfish in the world to digest the daily increase of the mass which now threatened to crowd him out of the laboratory, but there was the ocean, densely populated with hungry creatures who would tear his creation to bits and devour it. To be sure, some of them might be captured and absorbed by the thing, but the balance would be in favor of the denizens of the deep.

Van Hooten blessed the fact that he was rich. His rapidly made plan was an expensive one, but that factor need not enter into his calculations. The only thing needed was speed, speed to toss the steadily growing thing into the sea before it got too large to handle.

Money will accomplish anything, given enough of it. In two weeks a swarm of mechanics, sworn to secrecy, had built a cage in the laboratory large enough to hold the mass. It was made of solid steel and was equipped with huge wheels. When the tissue had been forced into the cage by means of hydraulic jacks, the open side was closed in and the thing was ready for its last long journey.

Workmen tore out one wall of the laboratory. That night three huge trucks backed up to the gap. They were fastened in tandem to a ring in the cage. At the signal they started forward. The cage groaned and jolted out through the gap and started toward Brooklyn where a chartered cargo tramp waited with steam up. As soon as the cage was hoisted on board the ship began to move.

For six days it steamed due east, the mass growing daily. It was fifteen feet in diameter when the captain of the ship pricked on his chart a position midway between Europe and America.

"This is the place!" cried Van Hooten. "Drop it overboard."

The ship's propeller ceased to revolve. The donkey engine snorted and slowly lifted the steel cage from the deck. It swung it out over the water. Mechanics swarmed up and started to remove the bottom. As two of the heavy bars fell away under their manipulation, the thing oozed out through the gap and fell. With a resounding splash it landed in the ocean. For an instant it floated, then sank beneath the waves.

Van Hooten dropped on his knees while a deepfelt prayer of thankfulness rose from his heart. More cheerful than he had been for many months, he gave the order which turned the ship's head toward Brooklyn.

CHAPTER II

The Monster Appears

● Once back on land, Van Hooten rebuilt his laboratory and plunged into other experiments. The insight into the nature of life which his former experiments had given him stood him in good stead. He turned his attention to the malignant microscopic entities which take such an appalling toll of human life and soon became one of the world's greatest authorities on disease germs and serums. He even made some progress toward defeating the greatest menace of all, carcinoma, but this work he hated. The malignant giant cells reminded him too strongly of what he strove to forget, the fearful life he had created years before.

He thought of that experiment only occasionally, and then with a silent prayer of thankfulness that he had found a way to destroy the menace. Years ago it had been swallowed up in the sea, to be food for the teeming life which inhabited the waters. Twenty years had passed since he had dropped the mass of tissue overboard in Mid-Atlantic. Long ago its destruction had been complete. That experiment, he thought, was a closed chapter.

And all the while, unknown to anyone, in the depths of the sea, the mass grew steadily larger.

When Van Hooten had dropped it, the inhabitants of the ocean had not been loath to feed upon it. They attacked it voraciously, glutting their ravenous appetites. For a time the issue hung in the balance. Once in a while a fish would be caught and absorbed and countless animalculae and quantities of seaweed went to nourish it. At last the tide turned definitely. The daily growth became more than the consumption by the fish. Slowly the mass increased in size. As it grew larger it adapted itself to its new surroundings. Now only the largest fish could approach it without being caught and going to feed its insatiable appetite. Far down in the ocean depths it grew larger and more malignant until its size was such that it filled the ocean from the floor almost to the surface. And only then did humanity become aware of the menace which lurked in the depths.

Probably the *Monsoon* was the first to see it. At least she was the first of the long series of ships which disappeared in the Atlantic without trace. She sailed from Liverpool for New York. She was spoken twice in the next three days, then she dropped out of man's ken. There was no storm to account for her loss and no wreckage was ever found. She simply disappeared.

The nine day's wonder which her disappearance caused had not died down before a second ship, the *Nokomis* disappeared. Aside from the fact that she sailed east instead of west, the circumstances were quite similar. She was spoken along the North Atlantic track for a matter of five days, then she was gone. The press of two continents waxed eloquent and demanded solution of the mystery. Navy vessels were started on a patrol of the North Atlantic track, but they found nothing. Eight more ships vanished before the *Lodantic* radioed frantically for help. A dozen warships answered her call. They found her making full steam for New York under the charge of a badly shaken captain and crew. The story they told would have been incredible had it not been verified by every one of the six hundred passengers the *Lodantic* carried.

She was four days out of Liverpool, proceeding along the North Atlantic track toward New York when there came a sudden jangling of bells from the interior of the boat. The engines ceased their throbbing for an instant, then started up in reverse. The *Lodantic* shivered throughout her length and the riven water swirled up about her stern as her twin screws strove to arrest the forward motion. The passengers sprang to their feet and milled around uncertainly. The shill cry of a child sounded from the port rail.

"Daddy, look here, quick! There's a million fish out here!"

A dozen of the passengers joined her at the rail. The child had spoken the truth. The sea was literally alive with sharks—dozens of them—hundreds of them. They swarmed about the ship and for as far as the eye could see, they milled about in the water in a long fringe of movement extending to the north and to the south. They were in a state of ceaseless activity, now charging forward and turning on their backs as if to strike, now retreating at express speed. It was evident that they were feeding on something below the surface of the water.

A sudden cry of amazement came from the passengers. Three hundred yards ahead of the *Lodantic* a strange grey mass rose slowly above the surface of the water. It was a dull opaque grey, so dark as to be almost black where the sun struck it. It rose slowly, then ceased its movement when it was a few feet above the surface, but it extended for miles. Only on the far horizon could be seen a line where waves broke against it as against a beach. At the edge swarmed the sharks, feeding ceaselessly on its substance.

"In Heaven's name, what is it?" cried a passenger.

No one could answer the question, least of all Captain Eames who emerged from his cabin and hastened to the bridge.

"What's the trouble, Mister Blake?" he demanded of the first officer.

Blake pointed toward the phenomenon ahead.

"I can't tell you, sir. I've never seen anything like it. It has some resemblance to a huge jelly-fish, but who ever heard of a jelly-fish ten miles across? It's something alive, to judge by the action of those fish."

● Captain Eames took a glass from his subordinate's hand and studied the strange object. It showed an irregular surface, raised a few feet above the ocean level, rough and marked with white lines and splotches, like the scars of old wounds. It lay without movement less than fifty yards from the bow of the *Lodantic,* whose reversed engines had brought her to rest.

"It's a new one on me," he confessed. "It must be some form of marine life which hasn't been catalogued yet. I expect we ought to take a closer look at it."

"If you think it's safe, sir."

"Oh, it looks safe enough, Blake. The sharks are the main danger and they won't attack a boat. Would you like to row up to it?"

"Yes, sir, I wouldn't mind, if we can spare the time."

"We aren't carrying mails and we're half a day ahead of schedule. Go ahead, it won't delay us long."

The first officer turned and gave a crisp order. There was a flurry of movement on the boat deck and No. 2 lifeboat, the largest on the *Lodantic,* was swung out on her davits. With Blake in the stern and manned by a crew of a dozen seamen, she was pushed off.

Blake watched the sharks anxiously, but the huge fish paid no attention to the boat. There was more interesting game ahead.

The lifeboat pulled up toward the mass until the bow nearly touched it. It was of a thicker consistency than Blake had thought when he had examined it through the glass. Close at hand it did not resemble the tenuous body of a jelly-fish except for the fact that its skin was thin and semi-transparent. Deep in its depths could be seen dark nebular blotches.

"Closer, men," cried Blake.

The boat moved forward. Blake swung hard on the tiller and turned the boat broadside to the strange object. It drifted slowly in until it rested against it. Blake leaned over the gunwale and touched the skin.

The mass gave slightly under the pressure of his hand. Blake grasped at it. He caught hold of it easily enough but when he pulled, it did not give as he had expected. Instead, the portion which he had gripped began to retract into the mass. Blake maintained his hold and pulled with all his strength. The boat was forced hard against the side of the object. A way opened and the boat drifted into the mass until it lay in a little lane. Blake released his grip and tried to draw back his hand.

A cry of alarm broke from his lips. His hand had been drawn down into a long pocket which had opened in the flesh. When he relaxed his grip and strove to draw back his hand, the pocket closed like a flash. His arm was imprisoned in a grip which he could not dislodge.

"The thing's caught my arm," he cried. "Help me here, one of you!"

The nearest seaman grasped at his superior's shoulder and strove to pull him free. Blake tugged with him for a moment. Then a scream of pain broke from his lips.

"Pull!" he cried. "The damned thing is chewing my arm off!"

Scream after scream of pain came from his drawn lips. Others of the seamen added their strength to his, but their efforts were futile. The flesh which held Blake's hand began to sink, forming another long pocket. The men pulled but their strength was as nothing to the might opposing them. Further and further over the edge of the boat went Blake. At length he was drawn out of the craft until only the grip of the seamen on his legs kept him from dropping into the menacing pocket which had opened to receive him.

Still the steady pull continued. The men were hauled to the edge of the boat and nearly over the gunwales. Suddenly the end came. With startling suddenness the yawning pocket closed over the struggling man. Only his feet stood above the leathery surface. Before the frightened gaze of the boat's crew the feet sank until they disappeared. Where Blake had been was now merely a dark splotch under the surface, dimly visible through the semi-transparent skin.

"Gawd!" cried one of the men in awe. "It's swallered 'im."

A cry of alarm from one of his companions answered him.

"The bloody thing's arfter us too! Pull, mytes, or we're goners!"

The reason for the alarm was obvious. The boat had been hauled by the pull on Blake's arm into a sort of bay which had opened before it. Flesh rose on three sides of them. Now the mass was slowly but surely closing in behind them until there was a path of water leading to the *Lodantic* barely wide enough for their boat to pass through. With cries of alarm the crew grasped their oars.

Their action came too late. Already there was no water into which their oar-blades could dip. On all sides the dull, lifeless-looking flesh was touching the boat. They thrust out their oars, strove to push it back. The oars sank readily into pockets which opened before them. When the men strove to withdraw them, the pockets closed with incredible rapidity, imprisoning the oars in a grip which their efforts could not dislodge.

"My Gawd, look!" came a wail from the seaman who had first given the alarm.

The mass was rising slowly. Even as they turned to meet the menace it began to flow slowly over the boat's gunwales. With the few oars which were not held fast the seamen hammered at the oncoming wave of flesh. Their blows fell futilely. They cut through the soft flesh to the wood of the gunwales, but the wounds did not affect the relentless onward flow of the flesh. A few pocket knives appeared, but they were as useless as the oars in stopping the steady movement.

One of the men attacked the mass with his bare hands. For a moment it looked as though he might be successful for the thing gave way before his attack. He did not notice that it was drawing his hands into one of the fatal pockets which had engulfed Blake. In another moment the pocket closed and he was screaming helplessly, held by both hands in a death grip.

The path to their ship had closed behind them. On all sides rose the hideous flesh. The men fought and screamed, but all to no avail. Remorselessly and certainly the mass rolled on until it towered above them on all sides. There was a sudden movement and it closed over their heads.

● The *Lodantic* had not been idle. As the mass began to close around the doomed boat, Captain Eames had barked sharp orders. The twin screws began to revolve, slowly at first, and then as the ship gained headway, at full speed. Straight toward the mass of flesh Captain Eames hurled the bulk of his six thousand ton steel ship.

There was a jar as the prow of the *Lodantic* struck the mass. For fifty yards it plowed its way forward before it came to a stop, its propellers churning the water uselessly. The imprisoned lifeboat was but a few yards from the side of the ship when it sank out of sight.

"Look out, Captain!" cried the second officer. "We'll be caught too in a minute!"

Captain Eames' face paled as he looked over the side. The mass of flesh was creeping slowly up the sides of the *Lodantic*. At the same time it was spreading out toward the stern of the ship.

"Full speed astern!" he cried.

The engine room telegraph moved swiftly under the manipulation of the second officer. The huge engines paused for an instant, then began throbbing in reverse. For all their strength, the *Lodantic* did not move. Steadily the mass flowed on toward the stern of the ship. Inspiration suddenly visited Captain Eames.

"Stop the engines!" he cried.

The huge engines stopped with a jar. Captain Eames stepped to the engine room telephone.

"MacArdle," he said in a shaking voice, "something has us caught here. Stand by at your engines. When I give the words, let me have every ounce of steam you can raise. In reverse, mind!"

He turned from the telephone and looked again over the side. The flesh was not rising much on the sides of the ship as yet, but slowly and surely it was flowing toward the stern to surround it. It flowed around until it joined with no signs of a break. The *Lodantic* was securely caught.

"*Now*, MacArdle!" cried Captain Eames.

The fabric of the ship shook as the two huge screws revolved with the full power of the engines behind them. As they whirled, huge blobs of flesh were torn loose and cast up into the air, to fall back with a splash into the water. The powerful propellers were doing their work.

There was a heaving movement over the whole surface of the mass. Momentarily the grip on the ship was relaxed. The propellers bit the water and the *Lodantic* moved backwards. The mass closed again, but it was too late. The ship had moved far enough to the rear so that the closing flesh caught only the sloping prow. It held on with a death grip, but an inch at a time the *Lodantic* won free. With a sudden movement she shot clear into the open water.

She backed for a mile before Captain Eames dared to change her course. Then at his command the engines began a forward movement and the *Lodantic* swung in a wide circle until her stern was toward the mass behind. The waves still broke over and then—it was gone. As far as the eye could see the sea was broken up in swirling whirlpools. Gradually they subsided and nothing marred the serenity of the water's surface.

"In God's name, what was it, Captain?" came in awed accents from the second officer's lips. Captain Eames turned toward him slowly.

"Ask God what it was," he said solemnly. "I have sailed the seas for thirty years and I have seen nothing like it. Take charge of the bridge, Mr. Carmody. I am going to the wireless house and report it to the ships of the naval patrol."

When the *Lodantic's* story was published, the first reaction of the world was a gust of laughter. The public suspected a gigantic hoax, some new advertising scheme. But gradually their attitude changed. It was manifestly impossible that the whole crew and passenger list of the *Lodantic* could connive at such a sell without someone giving it away. As the fact dawned upon the public consciousness that a dozen members of the crew had lost their lives, belief followed laughter and the press began to clamor for action. They were quick to seize on the obvious explanation of the loss of the *Monsoon*, the *Nokomis*, and the other missing ships. The aroused governments of the United States and England acted in concert and their navies patrolled the North Atlantic.

Of all the world, only Erasmus Van Hooten knew what it was that the *Lodantic* had seen. He had not connected up the loss of the ships with the mass of growing tissue he had thrown into the Atlantic two decades before, but when he read the description given by passengers on the *Lodantic*, he knew what it must be. For a day he was stunned, his mind unable to grasp the situation. Then his brain began to function. His first thought was to tell, to tell everyone who would listen, but either his essential shyness, the same thing that had made him conceal the fact of his discovery from the world for a generation, or a sober fear of the consequences of a late revelation, made him pause.

CHAPTER III

At Bay!

● His mind revolved in circles for a while. He had tried years before every method which his ingenuity could devise to destroy the mass of flesh—and had failed. He could think of no further experiments to make. Obviously the thing to do was to seek for help. That night a hundred carefully worded telegrams and cables went out from his serumological laboratory in New York. The next day a hundred of the greatest scientists of the world read the messages and wondered what Van Hooten had up his sleeve this time. It is a tribute to the magic of his name that sixty-two of them dropped their work and hastened to New York to attend the conference he had called for ten days later.

The morning he had set for the meeting, the press of the world carried a new story, one that surpassed in horror and thrills even the story of the *Lodantic.*

H. M. S. *Invincible* was plowing along on her patrol course, keeping touch with the other vessels of the patrol by wireless. On the horizon could be seen distant smudges of smoke where other ships steamed, also seeking the new menace to navigation. Only a few miles to the south, the U. S. S. *Albatross* was proceeding toward her station to relieve the *Petrel* who had been on patrol for a week. The *Albatross* had exchanged messages for a few minutes before with the *Invincible*, each reporting that no sign of the thing had been seen.

With a sudden shock the *Invincible's* forward motion ceased. Her twin screws still labored, but they had a different note, as though they were revolving in a medium denser than water.

In an instant the ship seethed with excitement. Bugles blew, summoning the crew to battle stations. Officers scurried to their posts, the commander and the executive officer hastening to the bridge. In a few moments the cause for the stoppage became evident. On all sides about them a dull grey opaque mass like wet leather rose slightly above the surface of the sea. The *Invincible* was caught fast in the middle of the object she had been seeking.

For a moment confusion reigned, then the stern discippline of the British Navy came to the rescue. The crew stood at battle stations, ready for commands. The commander was in a quandry. None of his guns could be depressed enough to fire into the mass. Nor did he dare to toss depth charges over his rail, lest the resulting detonation close by the side of the ship would crush in her shell. A solution came quickly to his trained mind.

The radio buzzed as word of their predicament was flashed to the *Albatross* and the other ships of the patrol. There was a roar of starting motors and the four planes which the *Invincible* carried were catapaulted into the air, their racks filled with bombs.

The planes climbed rapidly to get enough elevation, then launched their deadly missiles downwards toward the bulk. Bomb after bomb struck the mass. They burst and tore huge craters in the grey flesh, but the holes filled in rapidly. A tremor ran through the whole mass, a tremor which shook the *Invincible*, held firmly in a tenacious grip. But still the edges of grey stole slowly but steadily up the *Invincible's* sides, making ready to engulf her. The portion about the ship began to sink, drawing her into a huge pocket of flesh. Down she sank until the gun deck was below the surface of the main mass. Then it was that the fifteen-inch rifles of the *Invincible* could bear and they began to roar, sending tons of steel-clad explosive into the monster. The bursting shells tore huge holes in the mass, but nothing stopped the steady sinking of the ship. As a last resort depth charges were tossed over the rail to explode on the surface of the flesh, tearing great holes in it. All was useless. Deeper into the pocket sank the doomed ship.

Radio messages to the planes ordered them to keep clear and to join the *Albatross.* They flew away, their bomb racks empty. The last message from the ill-fated ship was to the *Albatross.* It read: "Sinking rapidly. Depth charges and gunfire have no effect. Please continue attack from outside. Carry on."

Hardly had the message been received than the flesh closed over the *Invincible* with a sudden motion and the British Navy was left to mourn one of her finest battleships. The grey object sank slowly under the waves of the ocean, carrying the doomed ship with it.

As long as there was anything at which to fire, the *Albatross* held her ground. Her six-inch guns grew hot from the speed with which they were served, but their effect was nil. The twelve torpedos which she carried were launched against the menace. They detonated, throwing fountains of rended flesh high into the air, but nothing stopped the steady sinking of the *Invincible.* When the British ship had disappeared, the *Albatross* turned tail and fled at her best speed from the spot of doom. Above her winged the four planes of the *Invincible*, seeking another ship which had the tackle to lift them onto her decks.

The assembled scientists were discussing the latest horror when Erasmus Van Hooten entered the hall in which they were gathered. He greeted them shyly, then mounted a platform built at one end of the hall and began to speak, slowly and haltingly at first, then with more vigor as he forgot his embarrassment and warmed to his subject.

"Gentlemen," he said. "I notice that all of you are discussing the loss of the *Invincible* and the new menace which threatens oceanic travel. It is to consider means of combatting this thing that I called you together. Before we can make plans, it is essential that we understand fully just what it is we are to fight. I, alone of all the world, know that. I alone am responsible for this thing that is making the seas unsafe. It is an object of my own creating."

There was a murmur of astonishment at his words. Van Hooten flushed hotly, then went on as the murmur died down. He described in detail the experiments he had made to kill the menace years before. When this had all been laid before them, in hesitating tones he told of its origin.

● When he had ended, there was a moment of stunned silence, then a ripple of laughter, quickly hushed. The scientists looked from one to another, pity and astonishment on their faces. Van Hooten smiled wryly.

"I realize that you think me mad," he said, "and I wish that I were, that all this were a fevered dream, but unfortunately I am as sane as any of you. I did not expect to be believed without proof, so proof is ready. In the next room is gathered together the materials and apparatus for my synthesis. Before your eyes I will create life, such life as is today living and growing in the Atlantic. If you will come with me, I will repeat my fatal experiment."

They followed him wonderingly into the laboratory. At his request one after another tested his apparatus and materials to make sure they were sterile, devoid of life. Then before their eyes Van Hooten began to work. In an hour he straightened up, beckoned the nearest man to the microscope. One after another the sixty-two scientists peered through the instrument, then stepped away, amazement struggling with belief in their faces. Through the lens they had seen living, growing cells.

"You see, gentlemen," said Van Hooten wearily. "I can create life, but what I have created, I cannot destroy. That is your task. I will ask that some of you stay here and help me repeat this synthesis until we have enough tissue created to give each of you a sample with which to experiment. These samples you can take home with you and try to find a means of destroying. I need not tell you that it is highly advisable that no word of this be allowed to reach the public."

Despite Van Hooten's warning, someone talked. In twenty-four hours the press had a garbled account. In order to clear the situation Van Hooten was forced to grant an interview in which he told all of the story. Public excitement rose to fever heat. In sixty laboratories throughout the world eminent scientists worked feverishly far into the night seeking for ways to destroy the steadily growing bits of tissue which the genius of Van Hooten had created. In his own laboratory Van Hooten labored night and day, aided by two of the scientists who had answered his call, Dr. Chang Yen Tong of Pekin and Dr. Albert Gustafson of Copenhagen. Old friends of Van Hooten, they had accepted his invitation to perform their experiments in his splendidly equipped laboratory.

Days passed, weeks, and months, and still the reports from the laboratories were the same. There were many ways found to destroy the small bits of flesh with which they were experimenting, but no method which was applicable to a mass of it miles in diameter. And still the menace in the North Atlantic continued to grow.

For a time it remained comparatively immobile on the North Atlantic track. Shipping was routed far to the south, but when victims to feed its insatiable appetite became few, the thing began to move. It appeared on the South Atlantic track and wrought havoc, still impervious to the gunfire which the patrolling naval vessels poured into it whenever it appeared above the surface of the water to drag another victim into its maw.

Then one day horror swept New York City. The thing was moving slowly but resistlessly toward the harbor.

It advanced clear up to the shore. For a time it rested there after dragging down all the shipping in the harbor. Then one day it began to roll up onto Staten Island. Artillery, hurried from every army post in the United States, poured unavailing fire into it while bombers showered it with the largest bombs. The wounds made healed swiftly and the mass advanced slowly but inexorably. As a last resort, army engineers buried tons of explosive in its path. When the mass rolled over the buried mines they were exploded. They wrought havoc and were the first means that mankind had found to combat the thing. As the huge masses of explosive tore the front of the advancing flesh to ribbons, it ceased to go forward. For a time it was static. Huge bombing planes hurried up to drop four thousand-pound bombs onto the outer edge with terrible disruptive effect. At last the thing began to retreat sluggishly, reluctantly, toward the sea. New York was saved.

Paens of thanksgiving rose to the heavens, especially when the thing retreated still further. In two days the leathery mass had left the harbor and was going seaward. It stopped, however, a few miles off shore, effectively blocking the harbor and stopping the commerce of New York.

It was the day that the thing started to retreat that Dr. Chang, working in Van Hooten's laboratory, got the first glimmering idea of a method which might prove successful. He summoned Van Hooten and Anderson and the three worked almost day and night for a fortnight. Then from New York went out messages which called the six greatest pathologists of the country to the laboratory. When they had assembled, Dr. Chang announced his momentous discovery.

"For many years, as you know," he said, "I have been studying the various forms of carcinoma.* Dr. Van Hooten and I have worked along similar lines, often corresponding and meeting to compare results. Unfortunately we have found as yet no remedy for this malign condition, but we have learned a great deal about it. One of the first things which attracted my attention was the great resemblance between the cells created by Dr. Van Hooten's synthesis and those developed in malignant carcinoma. Although similar in appearance and habits and taking the same strains, there the resemblance ends. Van Hooten's cells do not react to the gamma radiation of radium or to the X-ray as do carcinoma cells and there are other great differences which I need not detail.

"Two axioms of cell life are that no cell can live in a medium of its own excreta** and that similar cells developed from one another are highly antagonistic.*** This opened two possible lines of experimentation for me.

"The first was impossible to apply, although the principle was one which would have been successful. I turned to the second. I met with failure after failure, yet in the end I have been, I think, successful. While ordinary carcinomas are powerless against Van Hooten's cells, in fact the carcinoma cells are simply absorbed and digested, I have managed to develop a new type of carcinoma of greater malignancy and potency than any heretofore known, by a simple modification of the carcinoma germ which I isolated three years ago. Once started, this new condition will completely envelop a human body in two hours."

A gasp of horror went up from the listening doctors. Such a horror might easily be worse than the menace the world faced. The Oriental smiled slightly and went on in a calm voice.

"Luckily, such a cell formation is artificial and very impermanent, except under certain conditions. It is singularly permanent in Van Hooten's cells and travels through them faster than through human tissue as I have demonstrated to my satisfaction. To make a successful inoculation with the disease, the solution must be fresh. Deprived of tissue on which to feed, the germs will die in a few minutes. Weak salt water, in fact, sea water, will kill it in the absence of tissue in a few seconds. In the presence of the correct type of food, sea water and even more powerful solutions are powerless. Hence, the only thing necessary to do is to inoculate the mass outside New York harbor with the germs of my new type of carcinoma. In a short time, the whole mass will be destroyed, and the germs themselves, deprived of food, will be almost instantly killed by the sea water."

A cheer greeted his statement. A buzz of excitement ran around the room as the six pathologists began to discuss means of accomplishing the feat. Chang held up his hand for silence.

"There are difficulties, gentlemen," he said, "but not insurmountable ones. To start with, I have not been able to inoculate any lower animal with this new disease. Only human beings can take it. Only living human tissue, tissue either either attached to or recently severed from a living person is affected. We must give this new disease to a human being, then cause him to be absorbed by this menace within two hours, or our work is useless."

There was a moment of stunned silence, a silence broken by Dr. Baldwin of Johns Hopkins.

"That should be possible," he said. "Some condemned criminal could be used . . ."

"Impossible," replied Dr. Chang. "Were this China in the days of the empire, such a solution would be practicable and easy, but your constitution prohibits 'cruel and unusual punishments.' The victim must be a volunteer."

"One could be found," suggested Dr. Baldwin.

"Will you volunteer, Doctor?" asked Chang bluntly.

The rubicond face of the pathologist paled. Chang laughed mirthlessly.

"You need not answer," he said. "You will not volunteer, nor will I . . . nor anyone else. We must seek other means. Many men would volunteer for death, swift sudden death, but not *that* death. Nor do I blame them. Our only solution that I can see is to kidnap a man, woman, or child, it matters not which, innoculate the victim and feed it to the menace. Has anyone another idea?"

There was a chorus of protest at the Oriental's suggestion. Chang listened in inscrutable silence until there was again silence.

"That is the method I propose, gentlemen," he said quietly. "When you find a better one I will listen; but before you seek for volunteers and thus alarm the world so that a successful kidnaping will be impossible, search your hearts and answer truthfully whether you think you will find one."

"If not a single volunteer can be found, the race of men deserve to die," retorted Dr. Wilson of Leland Stanford hotly.

" 'Let he who is without sin among you'," smiled Chang. "I take it then that *you* volunteer, Dr. Wilson? Ah, I hardly thought so. Surely it is not too much for us to select one victim for sacrifice that the race may live. Remember that the tissue mass is growing daily. In time it will fill the entire ocean, then overflow the land. All life except it will cease and then it will die from starvation. One life must be sacrificed."

There was a murmur of assent from his listeners.

"I take it then that you are agreed to my plan of kidnaping?" continued Chang.

There was a hesitating mumur of assent.

"And that you will each of you assist me in abducting the victim and in making the sacrifice?"

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* Carcinoma—a malignant tumor on the surface of the body.

** Compare the common process of fermentation. Alcohol is the excreta of cells of the yeast family and this law is the reason why no alcoholic concentration of greater than about 17% can be obtained by fermentation. When the excreta (alcohol) concentration rises above this figure, the yeast cells die.

*** The theory of the principle of the rabies or hydrophobia treatment is that the rabies anti-toxin is developed from the rabies germ by a double modification. The two modified types are intensely hostile to the true rabies germ and kill it off. The two modifications are in turn exterminated by one another.

There was a long minute of complete silence. Chang's voice was bitter when he spoke.

"Brave men," he exclaimed. "Benefactors of the human race. Allow me to congratulate you. Don't worry, I'm not going to ask a single one of you to risk his standing by going counter to your law, your sacred law which you flout and break daily in innumerable ways. A volunteer was found before you were ever called to meet here. I volunteered to give my life for the redemption of the world, but another man had a greater claim and to him I renounced the honor, for honor it is. Dr. Erasmus Van Hooten will gladly give his life, one of the most valuable in the world, to kill the menace which his transcendental genius created. Dr. Van Hooten, I salute you!"

He bowed low before the pale-faced scientist. A murmur of applause broke out which died swiftly as Chang swept the room with his inscrutable gaze.

"Our plans are all laid," went on the Chinese. "A chartered plane waits us at Mineola and the inoculating serums are now being prepared in the laboratory. We will be ready to start in a few minutes. I wish you to come along as witnesses, nothing more. I will handle the serums so that you will not be exposed in the slightest degree."

As he spoke a white-clad assistant entered the room with a sealed ampule of colorless liquid. Chang took it from him and held it up.

"Here is death, the most horrible death imaginable," he said solemnly, "and here is life—life for the world through sacrifice."

In silence the six men followed Van Hooten and Chang out of the laboratory. Waiting cars sped them to Mineola where a big transport plane awaited them. When they had entered, the plane roared off over the waters of the Atlantic.

In a few minutes the grey leathery mass was below them. They flew straight east until the far limit of its surface was seen, some thirty miles further. The plane headed back west while Van Hooten stripped off his clothing.

With sure hands that did not tremble, Chang snapped off the end of the ampule and drew its contents up into a hypodermic syringe.

"Are you steadfast, Erasmus?" he asked in a low voice, in which, despite his apparent calm, an undertone of affection and sorrow could be detected.

"I am ready, Tong. Do your part."

"And may the Gods of Old reward you," answered Chang as he drove the death-laden needle deep into Van Hooten's back, then into his arms and legs.

Before the horrified gaze of the passengers, the scientist's flesh began to visibly rot as the dreaded carcinoma took hold. In twenty minutes his whole body was one huge festering sore. Van Hooten was writhing with anguish, although no sounds of pain came from his tight-clenched jaws.

"It is time, Erasmus," said Chang quietly. "Life will leave you in a few moments."

Van Hooten nodded.

"Goodbye, gentlemen," he said quietly, his life-long shyness burned away by the searing fire of his pain. "I am glad to be able to destroy the menace I created, by my death. One thing I hope. I hope that my experience will be a lesson to all persons dabbling in things beyond their ken. Tong, my friend, promise me one thing. See that the true story of this affair is given to the world in time. Not now, but later when the first fierce passions of hate have gone. Will you?"

"I promise, Erasmus," said Chang softly.

Van Hooten opened the door of the plane cabin. He glanced down. The plane had turned back and was now over the center of the mass. With a long shudder, he leaped out. The watching men saw his body hurtle through the air and strike the wet leathery mass a hundred feet below. For an instant it lay there, then it was engulfed by a movement of the mass.

For half an hour the plane circled idly around, awaiting developments. Suddenly there was a change in the surface below them. Huge billows of flesh rose, then sank back. Wave-like undulations ran back and forth across it. Huge pockets opened, then closed again. At last a pocket opened at the place where Van Hooten's body had disappeared. From the interior of the monster was spewed out a mass of corruption which rose like a fountain in the air, then fell back on the surface. A horrible fetid stench filled the air. The mass writhed again, then sank suddenly beneath the waves. The plane turned and made its way back to the landing field.

The final chapter can be written simply by quoting from the log book of the U. S. S. *Concord* under the date of January 9th, 1938, six months after Van Hooten's sacrifice.

"Steaming east on North Atlantic track," it read. At 9:05 A. M. at about latitude 40° 10′ N, longitude 52° 41′ W, a mass of dark grey matter, estimated at fifty yards in diameter, appeared off the starboard bow. The mass gave off a vile odor, like that of rotten meat. It was shredding off at the edges and rapidly decreasing in size. Ship lay by to watch the phenomenon. The mass slowly disintegrated until at 3:16 P. M. it was less than twenty feet in diameter. Remainder sunk slowly, shredding off fetid matter rapidly. It is thought to be the last remains of the huge body of Van Hooten's cells which so disturbed oceanic travel last year."

THE END

HOW FAR CAN YOU SEE?

Can you picture the conditions on another world? Can you imagine a landscape on a world much smaller or much larger than our own? How far could you see on the surface of a tiny asteroid; how far on giant Jupiter? You have read of bodies 300,000,000 miles in diameter; on such a surface, from a height equal to that of the Empire State Building you could (theoretically) see an area as great as that of the Earth, and two moons thrown in. Some questions that you have often asked are answered in an article "How Far Can You See? in the January issue of

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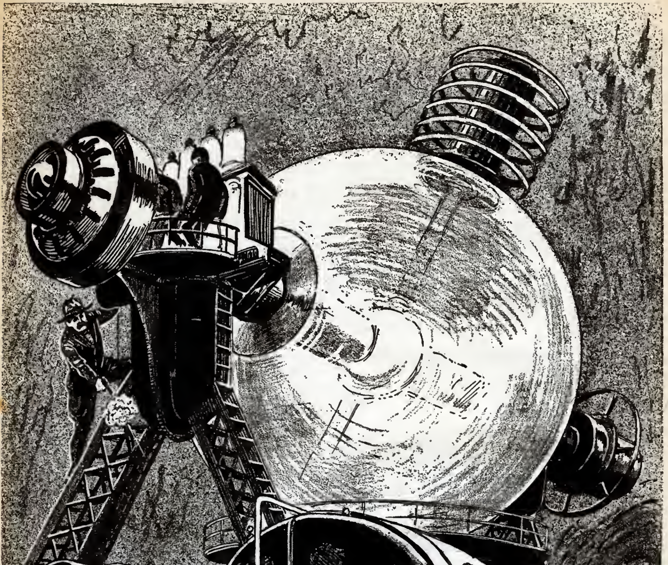

(Illustration by Paul)

Desperately I smashed at them in their sockets. The rubber handle of the wrench was all that saved me from being electrocuted. But Klassen was standing there aiming at me.

THE LAST OF THE LEMURIANS

By ARTHUR G. STANGLAND

● Much has been written about the Lemurians—vanished race of the Pacific, that was the western counterpart of the Atlanteans. Mr. Stangland has studied the legend carefully and formed his own ideas about them. This story is the result—of two men thrown precipitately into an adventure as unusual as man can conceive.

The story is also interesting because it shows that one cannot predict where scientific research will lead him; even the desire for adventure leads one into inconceivable situations. The ending to this story will surprise everyone—that is all except those who have read Mr. Gernsback's editorials carefully. In one of the recent editorials will be found the key to the mystery.

● "You're on your way to look for a village at the foot of Mt. Shasta!"

Each word was a little explosion as it burst from the storekeeper's mouth. He looked at me with new interest through his gold-rimmed glasses, as he handed me my cigarettes. Calmly, I took out change to pay him. I thought I detected fear in his eyes.

"Exactly," I answered, "I've heard some strange tales about the place so I'm going to investigate it for myself."

"What in the world's a young guy like you doin' up here—why ain't you workin' some place?" he sputtered at me.

"Because in the first place I've got sufficient money to live comfortably the rest of my life," I returned quickly, "and in the second place it's my hobby to trace down legends and stories with a scientific basis."

This time the old fellow took a good squint out of his dusty windows at my low slung, red-wheeled roadster. Apparently, it convinced him of the truth of my first remark.

"Well, I'm tellin' you, you're better off spendin' your money foolishly like all the rest of the young mutts nowadays 'stead o' comin' up here an' snoopin' around—liable to get into any kind of a mess!" And the man wagged his bald head ominously.

"Oh come now—again: just what do you know about this strange village?" I asked, pressing him more firmly than before.

For a full moment he regarded me, and from the expectant expression on his face I knew he had been withholding something.

"All right, young feller, I'll tell you what I know," he began with lowered voice, "and I'm a-tellin' you only to discourage you goin' any further. Not long ago I got pretty curious about all these rumors, and decided to take a hike on the south side of the mountain and see for myself. The place is far from any state highways down in a little valley out of sight.

"Well, I never reached it. Down in the redwoods a mean lookin' feller stopped me an' asked what I was a-doin' there. Well, I tell you I was so danged surprised to see 'im, that all I could do was gape at 'im for a moment. An' when I finally says 'I dunno,' he gets kinda mad-like, an' digs out a wicked lookin' automatic. The guy pointed it at me, and fired, takin' a nick out o' my shoe. It knocked me flat—besides all my curiosity. All I wanted to do was get home. An' he warned me never to come around again or he'd knock my block off—or somethin' like that, I forget exactly."

As he related his strange experience with eloquent pantomime, I lost no little detail. His honest blue eyes, widening with the unfolding of his impressive tale, the sincere conviction in his dry voice and the simple, unadorned word pictures he constructed for me revealed more than all else the truth of his story.

Discourage me? Why, the poor old fellow only goaded me the more with his tale! I was full of the fire of adventure and excitement in those days, and such stories and significant looks on people's faces only served to beckon me from one place to another, ever chasing the glamorous and fantastic.

"There's a range of three small peaks near the valley, isn't there?" I suggested, leading him on.

"No, no—it's near that old bald butte with a single tree near the top," corrected the old fellow naïvely, pointing out of his back windows.

I followed his pointing finger. It was a good five or six miles distant. The significant mystery that seemed to surround the spot drew me irresistibly. I turned to the man, little concealing my excitement.

"I'm leaving my car here in your care—see you tomorrow!"

As I went out the door, something very like "—damned young fool!" reached me, but anything he might have said would not have stopped me then. At last I had gathered enough data to make my way up there, and once again I was in the field tracing down another legend!

To me, Man himself presented a fascinating enigma. Through his early cave dwelling villages in Arizona and Colorado I had browsed. In prehistoric jungle-rotted villages of Central America I had wandered, and high in the forbidding Andes I had delved in Aztec ruins—always searching for the beginnings of Man recently arrived from Central Asia through Siberia and Alaska.

But this latest legend I had run across puzzled me greatly, and its potent possibilities intrigued me tremendously. Over a week I had spent near Mt. Shasta talking with all the people I could find who knew anything at all of the legendary village high upon the slopes of the mountain.

One thing struck me as peculiar: the closer to the mountain I got the more reluctant were the people in communicating anything at all about the village or the people in it. Yet one man had whispered that the people were the last that remained of the Lemurians, a race that had flourished on a great continent in mid-Pacific eons ago. However, this I discounted greatly, but it was something to think about.

Mountain climbing is filled with thrills, and not the least is the magnificent scenery from the far heights. Dangerous escapes from death may leave one with a nervous chill, but reaching the top and surveying a vast expanse leaves an exalted sensation of having shared a brief moment with the Infinite.

And from my position where I stood, Shasta seemed to fill all earth and sky with an awesome, majestic silence. Its vast bulk seemed to beckon to me—to reach out a hand and touch it, so close did it appear. Onward I trudged, ascending gradually on an almost direct line to the bald butte miles away that served as my landmark. The more I thought about it, the more I was dominated by a deepening sense of brooding mystery. Just what would I find? Would I too be threatened away?

"Halloo!"

● Thoroughly startled by a human voice in this dead silence, I looked about me, and then discovered after all the sound came from directly ahead. A man stood on the side of a little hill watching me.

"Halloo!" I answered, and my voice echoed back and forth.

Wondering who could be on this side of the mountain, I hurried down the little slope and up the other side, forgetting the appreciable load of my knapsack. The man was thick-set, and as I got up closer, his heavy, square jaw became the dominating feature of his whole friendly face.

"Climbing to the top?" inquired the man.

"No, just scouting around," I puffed, taking out a handkerchief to wipe the sweat from my forehead. "You on your way up?"

"Well, no—I'm not," he answered slowly, watching me with smiling deep-set eyes, "I'm sort of scouting around too."

"Know anything about a legendary village up here somewhere?" I began as we started up the slope.

"That's just what I'm looking for!" exclaimed the man.

So! Another adventurer on his way to the village. Joined by a common bond such as this we pooled the little knowledge we had of the mysterious mountain people, and agreed to make the search together. Barnes was the big fellow's name. Apparently, he knew as much—or as little—as I did about the legend. We tramped on up several ridges, and then had to take a course through a stand of redwood. I took out my pocket compass and got an azimuth reading on the bald butte before I lost sight of it.

We made our way down through little ravines and across rushing torrents white from glacier powder. It was as wild a country as I've ever seen outside of Central American jungles. Superb redwoods towered high above everything. According to my compass and the time we had travelled, I figured we could not be very far off from the bald butte. I was in the act of telling my new companion about it when a strange voice bellowed angrily at us from ahead.

"Halt!"

Greatly astonished, the two of us glanced up to see a big black-browed man standing looking down upon us threateningly from the top of a little slope. A fierce scowl on his large face gave him a very formidable appearance, especially enhanced by a handy looking automatic which he levelled right at us. It was a distinctly uncomfortable situation. Like a flash I recalled the old storekeeper's tale, and wondered in anguish which part of my anatomy the disagreeable fellow would take a nick out of.

"Well, what's the matter?" asked Barnes belligerently.

"This is private property. Get t'hell outa here, and get fast!"

"Where'd you get that big talk, fella?" Barnes shot back quickly. "First time I ever knew a national park had private property inside of it!"

I'll swear that impending murder leapt into the man's eyes, as he came on. Manifestly, he wasn't to be crossed with impunity. It isn't with shame that I record I felt damp, exceedingly so, on my forehead as I watched the black hole of the gun muzzle. Suddenly, a movement in the background behind the man attracted my eyes in astonishment. There stood a second man apparently having just stepped from behind a tree! He too had a powerful looking gun.

"Davis!"

The man in front whirled like a tiger at bay, bringing up his automatic swiftly as if in a belated attempt to fire. He had his chance, but he was too slow. A spiteful hiss from the newcomer's gun, and the formidable looking Mr. Davis pitched forward a dead man. I looked blankly at Barnes and he stared back in stupefaction at me.

Our unknown rescuer hurried down the slope to us. My first coherent impression of the man after that terrible moment we had lived was a drawn and haggard face and glittering blue eyes, holding something of vengeful triumph. He gave Davis a perfunctory examination on the way down, and then approached us with a wan, friendly smile, at the same time putting up his gun.

"Good thing I got him when I did, or he very likely would have killed you both if you had argued with him much longer. They're getting pretty desperate to keep people out!"

"Well, we certainly are indebted to you," I burst out warmly, "I thought for a moment we were ready for the pitchfork and brimstone! What's the meaning of all this?"

A Mountain of Power

● "My name is de Koningh," began our new found champion, talking rapidly.

I could see he was a man of the research laboratory and accustomed to heavy, ponderous language as a means of expression. But he surprised me. Under the stress of great emotion he minced no words, launching straight into the midst of the whole trouble.

Unknown to the public at large, he told us, two scientists, Dr. Hill and Professor McGraw, no longer associated with famous Pacific Coast universities, had established a research laboratory on the southern slope of Mt. Shasta where they felt they would be undisturbed. With them were several assistants to aid in the routine laboratory work.

Dr. Hill it seems had developed a working idea of Einstein's Unified Field Theory, and had arrived at that point where he wanted to test it in the experimental laboratory. But inasmuch as a terrific concentration of energy was contemplated, an explosion-proof workshop was highly desirable. Hence, a tunnel was bored into the heart of the mountain where they encountered a huge cavern.

Here, then, was what they wanted—a natural testing laboratory already carved out by nature. A great quartz sphere was moulded, set up in the cavern with all necessary equipment, and the two scientists began their investigations. For the benefit of our dull, mental capacities, de Koningh, I know, glossed over much of the abstruse theory involved, but I gathered that they were investigating a nice little compact equation of advanced mathematics which is a shorthand method of stating that electricity and magnetism and gravitation are all the same thing—thus promulgating that all nature begins in a glorified Unity.

Well, after much experimenting they were successful. Out of their endeavors grew a humming vortex of pure elemental energy inside the quartz sphere—a dynamic warp in space, a condensed whirlpool of energy—call it what you will, it doesn't matter. In any event they had succeeded in combining those three great mysteries of modern science—electricity, magnetism, gravitation.

Having only materialized their theory by trial and error, Hill and McGraw knew little of the properties of this new form of energy they had created or discovered, but to give it a name in their record of experiments they called it tentatively—"vorticity," to keep a crude etymological parallel with "electricity."

But unfortunately, as time passed, rumors—silly, absurd ones—got around the countryside. Curious groups appeared in the woods about. Fearing a raid on their laboratory by unscrupulous and jealous contemporaries, the scientists had hired Ramponi and some of his gunmen to discourage any such smouldering ideas.

"And that," exclaimed the excited assistant, "is where they made a fatal error. Klassen, an investigator unconnected with any scientific school or body, 'bought' Ramponi and his men. Day before yesterday he had the audacity to confront us at the instrument house and order us out, saying he was taking over all equipment. Dr. Hill had some acid in a beaker at the moment. It was a poor time to do anything so foolhardy with a bold man like Klassen, but he was so mad that he threw the whole beaker at the invaders. Of course he was killed then and there. McGraw seized a gun but Ramponi was too quick—killing human life is his profession."

"But—but what are you going to do?" My head whirled with the effort to grasp and assimilate the torrent of words and theories that spewed forth vehemently. "Vorticity" . . . Ramponi . . . Klassen . . . . It was a whole lot to comprehend thoroughly all at once, especially from the rapid-fire manner in which he spoke.

"The vortex, man!" expostulated de Koningh. "Klassen doesn't know that we discovered the quartz sphere is being eaten away from the *inside.* It's like a giant flywheel that may go to pieces any moment. And if it does—even the inertia of this mountain will be unable to hold such a tremendous concentration of power. It's a monstrous atom ready to explode!"

"But didn't you warn Klassen what would happen?" asked Barnes.

"Of course, but you don't know Klassen. He's one of these egomaniacs—wouldn't listen to us . . . branded us liars attempting to scare him away. Then he put us in a storehouse when we refused to help him. He's got ideas of applying for patents for himself."

So! We were standing on top of a giant bomb that might explode any moment.

"What do you propose to do now?" we asked him.

"You've got to help me! We must get to the instrument house and close off all the exciters or else God knows what'll happen!"

We started to hot foot it up the slope toward Davis' body.

"How did you know we were out here?" I wheezed.

"I saw Davis start for the woods. He'd been watching you from the top of the butte. You see, I'd slipped out of the south end of the shed where they had me trussed up."

"But where did you get the gun, de Koningh?"

"I had hidden it sometime before for emergency." He stooped and picked up Davis' gun. "Here's something we'll need."

"Give it to Jeff," suggested Barnes, "I've got one."

We hurried on through the trees like skulking shadows, for by now it was beginning to get dark. Any of the other gunmen would have difficulty in seeing us from a distance. I shudder now when I think of what I was going into so thoughtlessly. It wasn't courage . . . merely naïve shortsightedness in visualizing what could happen. Nothing violent had ever happened to me before. I didn't associate it with me now. Anyway, adventure has an appeal of its own.

● "Just how are we going to get possession of the instrument house—as you call it? And why that in particular?"

"The instrument house," began de Koningh in explanation, "is where all the recording mechanisms of the vortex are located and also the electrical controls of the exciters. I don't exactly know yet how we'll approach the place. We'll take a look over things pretty soon when we reach the edge of the woods."

"What are the 'exciters'?" I asked, puzzled.

"Those are two large coils on the exterior of the sphere concentric to the axis of the vortex which hold it in a plane parallel to Earth's axis—quite an intricate installation."

In response to a warning gesture from de Koningh, we ceased our whispering. Peering around the trunk of a huge Sequoia, we got our first glimpse of the hidden valley. It was a rather narrow indentation on the lower slopes of Shasta sloping slightly upward. Much of its detail was lost in the rapidly deepening twilight, but I saw in the farther end a black hole, blacker than the dark bank it entered. About the entrance way squatted several sheet-iron houses that seemed ghostly in their indefinite outline. It all looked peaceful enough to me in the gathering dusk. And yet in the air about us hummed a thin, shrill sound.

"What's that shrill humming?"

De Koningh's face gave me a chill.

"That's the vortex humming—a constant reminder of death!"

I looked at the tunnel entrance. If the vortex should explode, the force of it besides rocking the mountain would come flashing out of that hole right here where

I was standing—if we didn't get to the instrument house in time. Now, the necessity for action was driven home to me, and I think my first misgivings were born then. I guess the look in my round eyes affected Barnes.

"Well, if we're going to do anything—" he began, but de Koningh cut him off.

"We can't wait any time for complete darkness—just have to take a chance. Come on, follow me!"

However, first of all, Barnes and I discarded our knapsacks at the foot of the tree, and carried only our weapons. Quickly we plunged down the embankment after our guide. I must admit that I was most certainly a mixture of emotions, what with expecting the mountain to blow its head off any moment, and Ramponi waiting to blow ours off. Assuredly some things were beginning to take on a different aspect!

"See that first building nearest us?" queried the assistant.

"Yeah, it's on the right of the tunnel entrance," answered Barnes, peering through the dusk.

"That's where Ledgerwood is. I was in that one farthest to the right—close to the woods so that I was able to slip away during the daylight without being seen after Davis descended."

"Are you going to get him out first?" I asked.

"We've got to—need all the men we can get!"

Thereupon, we sneaked up the little valley, keeping as much behind objects as possible in our progress. And all the while in my ears hummed that damnable shrill song of impending disaster and death. I'm sure it wasn't glorified eagerness that caused me to trip unceremoniously over a large stone as I ran from a tree to a little hillock. I wouldn't have knowingly risked it for anything, because immediately a hateful hiss sounded in the darkness and sparks flew on the rocks to my left as the shell ricocheted. Hastily, I scurried to the protection of the hillock, fully appreciating for the first time the sensations of a dog with erect hair on his neck. I had been shot at for the first time in my life! The terrible realization struck me with all the force of "Eureka!"

"Didn't get you at all, did it?" asked Barnes in a stage whisper from behind a nearby bush.

"Never touched me!" But the more I thought about it the madder I got.

Peering discreetly around the hillock I could see lights in a building. De Koningh slipped over to me.

"There's no one in the instrument house just now," he reported, "they're over in that second building to the right of the tunnel. We've got to keep them there away from the control house. Shoot to kill if they fire any more!"

We were a hundred feet away from the nearest house. If we could reach the shelter of that we'd have an advantage. Like soldiers we infiltrated. Watching our chance we'd run forward, stooped over to another refuge of safety. I doubted *then* very much if Ramponi and his men could have seen us. They merely shot at the noise in the dark. A colorless dusk is an extremely difficult time of day to discern things accurately.

We withheld our fire, as no further shots came our way. I was beginning to have great hopes of reaching Ledgerwood's temporary prison and surprising the death watch. We reached it all right . . . .

And as we did, making our way stealthily up to the side door, a bright light flashed on us, adding a year to the burden I already carry.

"Put up the rods, youse mugs!"

It was the shock of a life time, I submit. Many are the "plans o' mice and men gang aft a-glee"!

Into the Pit

● Apparently, I was still standing there stupefied, for the same voice rasped out again.

"Throw your gun down!"

Barnes and de Koningh had already tossed theirs away. A fine kettle of fish! A sick feeling came over me when I harkened to that shrill hum that surrounded us everywhere we went. Vividly, I could see swirling concentrated fields of force straining mightily to burst the walls of a quartz prison, eating slowly but surely at the sphere like fluorine cutting into glass. Failure!

"It's de Koningh all right," said someone, "and a couple other birds he picked up!"

Dimly I could make out the forms of three men standing behind the light. One of them came forward, a dark, sneering man.

"Bumped Davis off, didn't you, de Koningh?" he began in an off-hand manner. "Oh, don't be surprised. We followed you and heard a few things!"

Strangely enough, all my anger had collapsed. I felt much like an ant racing helplessly about trying to avoid a steam roller, for nothing could assure me of his friendly intentions toward us. We were going down with flying colors.

"Got anything to say before we line you up against the wall?"

"No, damn your—!"

But before de Koningh could enjoy the pleasure of reviling the gunman to his face, the latter slapped the assistant viciously across the mouth, cutting his lips cruelly.

"Before the firing squad!"

Surely this was all a nightmare. And yet it was only too true! An intense sensation of cold gripped me, throttled me absolutely.

"Get Klassen!" ordered the man, turning to one of the others, "maybe he'd like to see this."

I glanced at Barnes. His usually ruddy face was as white as mine probably was, and his square jaw was clamped tight as a vice. We didn't have a chance. This, certainly, was the end.

"What's up, Ramponi?"

This must be Klassen. As he came into the light I got a good profile of him. A big man in a broad, solid way, with heavy jowels and a fat nose.

"Thought you'd like to see our little show here, Klassen," explained Ramponi.

His men moved around in front of us to be opposite the wall. The final scene was about to be enacted! I seemed to be stifling.

"Wait a bit!"

Klassen!

He came closer to de Koningh, peering into his face. "I need some one to help overhaul the rectifying coils on the vortex. Will you and these men do it?"

"Why haven't you asked Ledgerwood?"

"Ledgerwood had his chance this afternoon. The damned fool was shot trying to shut the vortex off! You have this chance to save your life and theirs. But also let Ledgerwood be a lesson to you!"

A black cloud of horror seemed to float away from me at his words. De Koningh was silent a moment. I knew what he was thinking. An excellent chance to get at the controls.

"All right!"

But now came Ramponi forward, snarling. "You spoil my show, boss. De Koningh killed my man Davis!"

"Shut your trap! These men are valuable to me just now. I've got to use them in my experiment. These lunkheads of yours might have been useful if they could do anything else but handle a gun! Come on—follow me and keep an eye on these birds." And Klassen started off.

"Nothing doing! We stay right here!" growled Ramponi.

The big man wheeled suddenly. "What! You aren't going?"

"We ain't going in there with that damned machine of yours!"

Klassen eyed the dark man a moment. "Give me a gun; I'll watch them myself. I always did think your courage came out of a steel rod!"

Ramponi sneered malignantly as he tossed his own weapon to the other. "Go ahead—play with your little toy. We'll stay here!"

When I followed the others ahead of Klassen, I felt like a man saved from the noose only to be sent to the electric chair later, for certainly nothing had ever looked more ominous to me than the entrance to the tunnel. It was like trying to reach a time bomb before it went off. The long bore was lighted for us, and as I entered it, I thought of all the thousands of tons of rock overhead that might come crashing down thunderously upon us if anything should happen.

Nothing much of consequence was said on that trek into the very bowels of Shasta. But I could imagine what was in the minds of the others as we drew closer to the big cavern. Noticeably, the humming had grown louder as we advanced. I knew and they knew, that every chance was going to be watched to disarm Klassen and shut down the vortex. Then we would take our chances with Ramponi and his gunmen. The closer we got to the cavern the greater my fright became. It was uncontrollable.

● At last the tunnel broadened out into a huge natural cavern in the center of which sat the ponderous ball upon a massive base. It lay in a yoke with two metal rings at the ends of either axis inclined 23½ degrees to coincide with the Earth's poles, and thus keep in centrifugal balance. It was surrounded by a complicated mass of electrical equipment and glass tubing. A vibrant hum seemed to permeate the whole place. I could even feel my clothes vibrating on me in sympathy. Covertly, I glanced at de Koningh. He was gazing up at the great ball intently.

"Well, come on, de Koningh!" snapped Klassen impatiently, "get busy over there on the rectifiers—you know what to do."

The assistant gestured to Barnes and me. At a cabinet he picked out several long rubber-handled tools which he handed to us. I didn't have the slightest idea what they were for, but apparently we were just to listen to instructions while de Koningh did the skilled work. I was careful to watch every movement, every twitch of his fine-drawn face, for any moment might be *the* moment to make a break when Klassen would be off guard. These tools were clumsy enough looking, but they would do admirably as weapons at close quarters.

Fearfully, I looked up at the great sphere. It was transparent and seemed devoid of anything. But up there whence came the great humming, I knew vast resources of power swirled, rebelling against restraint. Ever followed by the eagle-eyed Klassen who held his gun ready, de Koningh took us to the massive base of the machine. The whole affair reminded me of a radio transmitter combined with a big generating power plant, judging from the complicated mass of odd-shaped tubes glowing with violet and the great motors operating in gangs.

"Now be very careful in walking among these machines and conduits," warned de Koningh, "or you might get burned. Follow me carefully."

Adroitly, the assistant placed a foot on the fender of the base and stepped up. As I followed, I glanced around perfunctorily, taking pains to see where Klassen was posted. Yes, of course, he stood off at a safe distance! Somehow I sensed the tension among us, a sort of overtone above the electrical tension in the machinery around us. And Klassen was conscious of it also, conscious of our indefinable sense of watchful awareness.

We stood before a big coil something like a helix with a laminated core.

"This is it," announced de Koningh. "Jeff, take that long-handled wrench and put it down the inside of the coil. Grab hold of that nut at the bottom—keep it tight. Barnes you take up on the bolt on the opposite side. I've got to watch a synchronizing tube over here, and check with Klassen."

He waved his hand to our fat-nosed captor, signifying that all was in readiness. Klassen stood in front of a bank of open face dials and controls.

"Keep right on with your work and show no surprise," admonished de Koningh in a low voice, "we can talk low without him hearing us at all. Listen carefully to this: as soon as we are through with this test and repair, I'm going to get Klassen over here on a pretence. As soon as Barnes and I jump him, Jeff, you get over to that bank of tubes and smash them. They control the current in these polar 'exciters.' Watch carefully so there's no slip up!"

Slowly, I inserted the wrench between the coil and its supports, grasping the nut firmly. So! Our chance was coming! Vastly relieved, I looked up at the huge quartz sphere above me wondering just how long the thing would last before finally exploding.

"What are you going to do if you don't get a chance to jump him?" I posed.

De Koningh kept on adjusting the tube in front of him without looking up.

"We'll just have to hope and pray that we do get a chance. Otherwise both of you watch the first chance after that."

I was on pins and needles until the test was finished. Something in the machinery around us had an irregular habit of snapping loudly. And every time it did, I died a little death, fearing it was the quartz sphere cracking up right there in our helpless situation.

"Oh, Klassen!" yelled de Koningh above the power hum. My heart began to pound. The moment was coming! "What do you want?" came his surly answer.

"This spray shield on the booster tube is taking more voltage than usual. Better look at it."

Klassen gave a final glance at the dials he was reading, and then started in our direction. Barnes and I had extracted our long handled tools and stood resting on them—waiting. But Klassen was wary of us. He chose to come up on the other side of de Koningh.

"What's the matter with the tube you say?" he asked petulantly.

Anxiously, I watched for the first move. Carelessly, de Koningh stepped back and as he did so, he brought up his small hand wrench for a quick blow. Instantly, I acted. Lifting my tool out of the way of wiring and surrounding machinery, I jumped over a gang of motors. Two more steps and I reached the floor. Twenty feet to the tubes. All my tingling, nervous energy stored up from the tension of the last half hour let loose into my muscles as I leapt for the bank of tubes. A faint hiss of a gun sounded. How things were going back there I dared not to see. My eyes were on the tubes ahead of me. They were all that mattered.

The Mountain Speaks

● Desperately, I smashed at them in their sockets. Brilliant lacy webs of electricity flashed out in air. The rubber handles of the wrench were all that saved me from being electrocuted. I glanced back at the others. Something was surely wrong! Somehow or other Barnes had tangled his feet in the maize of rods and conduit and wires under foot. That little misstep had foiled our plans, for de Koningh had not disarmed Klassen with his one blow. And there was poor Barnes ludicrously struggling to free himself!

But the most distressing part of it all was Klassen standing there aiming at me! Instinctively, I ducked. But the shell went wild anyhow, shattering one of the last remaining tubes I had missed. Then Klassen immediately ran for the entrance to the tunnel. He took up a stand there, brandishing his gun.

"Finally made a break for it, did you?" he bellowed above a peculiar crescendo noise. "Well, you witless fools can thank me I didn't shoot you down where you stood. I'm making you stay here till you put in a whole new set of those conductance tubes!"

But instead of looking at him, we all turned and stared at the great quartz sphere that dominated the whole cavern. The shrill unending song that emanated from its vibrating depths was not diminishing in the least as we expected it to. No. It sounded louder, fiercer, in fact—*increasing to a higher pitch!*

Dumbly, I stared down at my feet, conscious of an ominous shuddering in the ground. Madly I scrambled out of the way as something popped on the panel behind me. Only a circuit fuse, but it might well have been a cannon for all the effect it had upon me. Again I stared up at the vortex. It seemed to be vibrating visibly, trembling up there on that massive solid base like a gyroscope cutting loose from its axes. God, the thing was going to explode!

And there stood Klassen barring our way to life—life that I suddenly dearly treasured. Any instant might come oblivion—! Viciously, I swung with all my might. The heavy wrench swirled through the air, rotating like the spokes of a wheel. Klassen, damn him, had plenty of time to avoid the missile, and it clattered harmlessly against the wall. But my weapon served its purpose after all in diverting his attention momentarily. De Koningh aimed swiftly and threw savagely, desperately. Straight as a bullet it went and not much slower. A strike! Full in the forehead the small wrench caught him!

Terror surged through us—made primitive men of us once again. All the impulses of a Neanderthal man making a kill welled up from my seething subconscious. My eyes were bulging from blood lust, and yet, too, I trembled in stark horror of being blasted asunder, bleeding and broken only to be engulfed in darkness and rock and suffocating earth. Even before he collapsed utterly to the ground we were upon him like a pack of timber wolves. An intense exultation seized me. Good! He was dead, curse his fat, pudgy nose, dead as a stone!

Still the shrill hollow whine of the runaway vortex rose to an ever maddening pitch. I shudder at the animal-like, inhuman way we sprang for poor Klassen, and the way we cursed him with insane, gibbering delight even as he lay there at our feet with a shattered skull. But what I remember most vividly from that horrible nightmare was the ghastly screeching of that vortex—that it alone awoke in us that terrible monster—FEAR!

"Barnes!"

Horrified, I stared at the man as he sank to the ground, trickling blood at the mouth and nose.

"Klassen got him in the lungs back there while we were fighting," explained de Koningh quickly. "Slip an arm under him—I'll get on this side and carry Klassen's gun. We've still got to get past Ramponi and his men. That gunman has a grievance he's liable to fight out as soon as he sees us!"

God, as if an exploding mountain wasn't bad enough without having to fight one's way out of it against odds! And still behind us was that ungodly thing shrieking like an animate gargantuan wounded unto death. Sobbing for breath and half carrying the luckless Barnes, de Koningh and I staggered along the length of that tunnel in a perfect agony of fear, wondering why we weren't already blown to smithereens.

In that mad, furious flight I seemed to unlock hidden stores of energy I never knew existed. Perhaps, too, that vast tide of fear that seemed to be overwhelming me drove me on like an automaton. De Koningh, small as he was, kept up his side of the burden like a young giant. And Barnes, rest his soul, was fast weakening, so that his legs dragged helplessly along the ground between us.

"For Heavens' sake . . . de Koningh," I puffed laboriously, "what . . . what happened anyway? I . . . broke all the . . . tubes. Still . . . the vortex . . . speeded up afterward . . . 'stead o' slowing down."

"I dunno." He gulped for breath to speak. "Think those . . . exciters acted like brakes on . . . the torque of the . . . vortex. Somehow . . . she got unbalanced and . . . the tremendous concentration of . . . lines of force acted . . . as a magnet to suck . . . more energy into the center . . . of the whirlpool . . . as soon as . . . the exciters were stopped. Now . . . she's spinning her head off!"

Screaming sirens! Inside my head somewhere. Surely I must stop and scream too. Tears of fierce rage coursed down my cheeks. But we must jog on with Barnes. Maybe we were both already in another world, an insane world of penetrating, screeching sound waves!

Suddenly ahead of us in the outlet of the tunnel appeared Ramponi. My sense of realities cleared.

"Hey, you mugs, where's Klassen!"

"Dead!" And de Koningh fired point-blank.

● Ramponi coughed with a liquid sound and died on his feet, crashing to the ground heavily. Immediately, several flashes in the darkness ahead betrayed the presence of the other henchmen of Ramponi. But they were the shots of unnerved men that whined harmlessly by us and ricocheted down the tunnel. The ungodly shriek that roared out of that cavern was too much for them. They broke and ran off into the night like frightened jackals.

That much I could see by a pale moon that hung low in the sky as soon as my eyes were accustomed to the outside night. And then came the incident that sobered me up from my debauchery of fear. Barnes, limp as a rag between us already, suddenly slumped, almost sagging to the ground. Wildly refusing to credit my fearful conjecture, I helped de Koningh ease him to the ground. Quickly, we examined him. I stood up, an unashamed sob in my throat.

"Come on, Jeff, for God's sake run!"

"But it seems so cruel to leave his body here!"

"Follow me, man!" And de Koningh grabbed my arm.

Down through the little valley we raced. Branches of little trees stung my face and body sharply. I barked my shins painfully on unseen logs. Big rocks seemed to appear from out of nowhere bruising my feet and ankles excruciatingly.

Suddenly, I felt a distinct earth movement and a deep booming. Fearfully, I looked over my shoulder in headlong flight and tripped ungracefully over a fallen limb. When I got up I could see that the tunnel had caved in. Clouds of dust billowed out into the pale light.

"Come on! Run for your life!" I told de Koningh.

My words went unheeded as he helped me up the steep bank at the end of the little valley. Then in the next instant I knew why, for a great, awesome roar seemed to reverberate around all over the inside of the mountain like the successive booming of thunder. The ground trembled where we stood. And as I turned to look at the mountain from the top of the bank, I was shaken by a sight that never failed to put the fear of fire-devils into primordial man. The whole vast bulk was quivering, loosing its white sheathing of ice and snow. And then the rumblings inside of it seemed to disgorge at the peak. With a huge explosion a great flame burst forth into the sky, hurling rocks and boulder and ice high in air.

It was a magnificent, deadly sight which we nearly paid for with our lives. Glaciers, creeping ponderously down its sides, suddenly were sent skidding helter-skelter down upon the slopes. Huge masses of solid granite came lunging upon the lower country, smashing everything in their paths. The ground heaved and sank with a translatory motion much like an actual earthquake.

Madly, we plunged into the friendly protection of the great Sequoias. Soon big rocks began bombarding the woods, falling with a tell-tale whistling sound. Terrified, we crouched in the shelter of the roots of trees until most of the stones had ceased falling.

We came to a torrent, too wild to ford. In a frightful fit of impatience and fear we groped up and down the bank, stumbling and cursing over boulders and through icy water in almost pitch darkness, searching for a fallen log across it. Came a warning whistle in the air. Then a crash up overhead, among the limbs of a redwood. Something ripped away with a long snapping, crackling sound.

Crazy with fright we fled helplessly around over the damned rocks while the unknown came plunging downward. In the blackness up the gushing creek it landed with an explosive crack. Gravel and water sprayed my face. But the frightening thing was a blessing in disguise. Hastily, we crossed the treacherous torrent on the thick limb, and continued on. Still from the direction of the mountain came an ominous rumbling.

At last we reached a safe distance from the heaving giant, and in the moonlight I sagged down upon a rock utterly exhausted. De Koningh stood in front of me.

* * * * *

"Well, it's certainly been a realistic dream, hasn't it, Jeff?"

I jerked my head up in astonishment. "*What!*"

Jeff Crang sat up in the massive chair, blinking his eyes.

"I say, it's been a realistic dream, hasn't it, Jeff?"

Understanding came into Crang's face then, and he sat forward.

"Well, I'll be doggoned!" he burst out. "Say, de Koningh, this is a great idea. At first I thought you were just fooling when you asked me to try out this 'hyper-suggester,' as you call it. Dreaming dreams to order—! Who ever heard of such an idea! How does the jigger work?"

De Koningh walked over to a recording machine that looked much like an enlarged dictaphone.

"All dreams, Jeff," he began, "do not originate from symbolisms in the subconscious. Many of them are the direct result of exterior suggestions—stimuli—such as sounds, temperature, etc. Maybe after you fall asleep, something creaks or snaps due to a fall of temperature in your room. Instantly, you have a dream in which perhaps a gun is fired. Now with controlled conditions I can manufacture a preconceived 'dream' or story such as you have just had.

"This recording cylinder contains the whole story in dialogue form, and this other cylinder alongside it contains sound stimuli such as the vortex hum, the rumbling of the mountain, gun-fire, etc., all synchronized with the continuity of the story, and of course, as you now know you heard all of it through those earphones on your head. Bodily stimuli, such as grasping objects, and walking, etc., are conveyed by these electrical contacts at your hands and feet. You see, it's all arranged like the sound effects in a radio play."

"But how did you appear in the 'dream'?"

"I wrote the whole story around you and me. Of course, I could have written it around a different set of characters, but you still would have experienced all the thoughts and emotions of the central character. However, I thought it would impress you more this way. And believe it or not, Jeff, this is soon to be the ultra-modern way of enjoying your fiction—actually living the story yourself as the hero."

"Well, it certainly is a success. I know it projected me upon the side of Mt. Shasta for awhile. I feel as if I've had a terrific experience—so vivid, so real! But the funniest part was when you just asked me: 'Well, it's certainly been a realistic dream hasn't it, Jeff?' That remark incorporated itself in my dream!"

THE END.

(*Illustration by Paul*)

My arm unsheathed the knife, and I plunged it into the soft leathery body again and again.

WHAT HAS GONE BEFORE

Haworth, Mason and Bigelow, after returning to earth from their exploration of Venus (The Voyage of the Asteroid—Summer 1932 Wonder Stories Quarterly) decide to explore Mars. They add to their number Bill Perkins, Haworth's mechanic; Teddy Colquist, explorer and athlete; and Jack Craig a young chemist.

They land upon Phobos, moon of Mars, and leaving Perkins with the ship proper, the others descend to the surface of Mars in a smaller rocket ship. Due to the fact that Colquist had jumped off the surface of Phobos and could not get back, the trip from Phobos to Mars has to be started suddenly, and without proper planning. Colquist is rescued in space but the small ship crashes on Mars where Colquist suffers a broken leg. The ship has to be abandoned and the crew has to descend quickly the mountain top on which they have landed to a deep valley where the air will be dense enough to support life.

They manage to establish communication by light flashes with the large ship on Phobos, but Perkins cannot help them. Mars is a dry arid place, and since their water supply gives out quickly they are faced with death by thirst. They start out to explore the land to find some water.

NOW GO ON WITH THE STORY

● We had discarded our heavy rubber space suits, for it was agreeably warm in the sunlight down here in the lower valley. The thermometer registered seventy-five degrees Fahrenheit—clear spring weather. We wore trousers, sweaters and coats, with our cartridge belts over all. In contrast to our former accoutrement we felt pleasantly light and unencumbered. The greatly lessened gravity on Mars enabled our earth-created bodies to per-

THE WRECK OF THE ASTEROID

By LAURENCE MANNING

In this installment, Mr. Manning's realistic and gripping story goes into its most exciting phases. We see our explorers besieged by hunger, thirst, loneliness, with rescue temptingly above them on Phobos, but utterly out of reach.

Mr. Manning brushes aside all nice fantasies of a Mars peopled with golden creatures just ready to bestow blessings on earth explorers. Instead there is a naked world, heartless, relentless. Yet he gives us an insight into a secret of the past that will stagger the imagination.

This is a true story of what interplanetary exploration will really mean and what it will demand of men who hope to conquer unknown worlds.

form astounding feats of strength. Jack leaped from a standing start six feet into the air and Teddy, looking on from his couch, laughingly assured him that when his leg was mended he was going to break the Martian high jump record. It was, perhaps, an unfortunate remark coming from him. He colored slightly and began assorting the pile of sundries beside him with his sound arm.

I noticd Jack shake his head impatiently once or twice as though he had a headache and when I questioned him, he admitted that he had been feeling dizzy for several hours.

"But Jack," I remarked, "you have had the heaviest load of us all to carry and no doubt it has tired you out."

"That is not it," said Jack, "I am not in the least tired but I feel as though I had left my stomach somewhere, I don't know quite how to say it. And my limbs don't altogether feel as though they belonged to me."

"Perhaps," suggested Mason, "it has something to do with the lessened gravity on Mars."

I rather agreed with Mason, and Haworth settled the matter by deciding that whatever the cause of Jack's tiredness the proper cure was rest and we all felt better about not having to leave Teddy alone, for of course there was no telling what dangers might beset him in our absence and he was not in a physical condition to defend himself.

We agreed to return around five in the afternoon, for the sun would set a few hours earlier in this deeply sunken valley than it would on the surface of Mars and we by no means wished to be lost here in the dark. For lunch we were to depend upon our emergency biscuits, half of which yet remained in our pockets. In case of accident, two shots were to be fired to bring rescue and in any event Jack was to light the fire about four o'clock, the rising smoke from which would guide us back to camp.

"Even if our stomachs fail to show us the way," added Mason.

We did not need to help Haworth up the ten-foot bank, for he took a running jump and made it flying! In high spirits Mason and I turned and set off down the dry stream bed. Haworth had reminded me that not only water but also a future food supply was still to be found and I kept my eyes on the vegetation along the rim of the watercourse. Mason kept his attention on the ground.

"Sooner or later we should come on a depression that may have moisture in it," he said. "Possibly we may want to dig. It's a pity we didn't bring a shovel, but perhaps we can find a stout stick that will serve to turn over this soft sand"

The bank gradually became lower until after half an hour's walk we could look over the top as we walked along. Many strange and curious trees and shrubs were to be seen. We came to a clump of small bushes with dead drooping leaves so closely resembling the oak that I gave an involuntary cry and leaped up onto the bank to examine them. The trunks were about an inch in diameter, the height being anywhere from two to ten feet. A curious wing-like membrane ran along the side of the trunk and out the branches, much like that of the earthly species *Euonymus alatus*, but considerably more pronounced.

At the base of each leaf-stalk stood a yellowish nut, some two inches long and an inch in diameter. I plucked one and examined it carefully, finally cracking it between two stones. The kernel was large and meaty and upon smelling it I determined to make a small trial of its flavor. Nothing could have been more appetizing. It tasted faintly like Rocquefort cheese, but mild and meaty, and its texture was like that of our earthly butternuts. I hastily filled my pocket to bursting with the nuts and felt much elated at my discovery, for these shrubs were so thickly and plentifully distributed they would surely prove an invaluable source of nutriment, if they proved to be wholesome.

Mason was out of sight and I hurried along to catch up. I found him around the next turn of the watercourse. He had broken off a branch from a tree and was busily scratching a hole in the sand with it.

"Find any water?"

"I don't know. This spot looked promising and I thought I'd dig a bit."

"Let me help."

"Surely. This is a stick just created for digging—see its blade?"

And indeed it was a curious shape. Thick at the butt, it tapered rapidly to a spear-like point from which pointed flanges barbed back along the stem—for all the world like a huge arrow-head. The breadth across the flat barbs was about ten inches and it made a very convenient extempore shovel. I climbed the bank to break off one for my own use and discovered that it had come from a singular sort of tree which, though only twenty feet or so in height, was more than four feet through the trunk at the ground. The branches did not jut out sideways from this trunk, but pointed upward at a slight angle.

"The aviator's delight!" grinned Mason, peering over the bank at me. "How would you like to make a parachute descent onto that fellow!"

There were no leaves remaining on the branches, but fruit of a sort—balls about four inches through. As if determined to be consistent, even these were covered with a fuzz of dry tiny points which pierced my fingers when I touched them. I seized the lowest branch and pulled, finding that it stripped off fairly easily down the trunk. There were two fruit on the branch and these I removed by stepping on them and pulling the wood away at the same time. One of them broke beneath my weight and I examined the pulp with interest. I stooped to smell it and found an aroma of startling fragrance. I carefully scraped up a tiny piece of it and cautiously touched it to my tongue. It was cool and slightly sweet, without much taste, but altogether delightful because of the piney, spicy smell. Tempting as it was, I dared not eat it until it had been analyzed.

I would have collected a supply to take back with us, except for the sharply thorned husks, but I compromised by knocking off half a dozen and leaving them in a pile on the bottom of the watercourse where we could pick them up on our return. I told Mason of my discovery and he looked surprised.

"What, those things edible! For a donkey, maybe!"

"I tell you the smell is delicious, man."

"Well, why don't you name them after yourself if you like them so?"

And that is what I have done, for the fruit proved thoroughly useful and nutritious. We called it the Thorn-apple or Spear-apple and I have given it the generic name *Biglowea* and specific name *spicata*, of course, after the spear-like branches.*

We dug for twenty minutes and made a hole about five feet deep, but found no indication of moisture.

"Let's leave it, Mason," I protested. "Should we find nothing better we can probably strike water here if we go deep enough—but we haven't much time to waste and perhaps we'll find a pool or a spring further along."

So we threw down our "spears" and went on. Presently we came to a large opening in the stream-bed. It was more than a hundred feet across and dry channels led away from it in three directions. On the southern bank there was no vegetation but a narrow stretch of red sand spreading some distance east and west. As with the sandy country near the head of the valley, this desert area was dotted here and there with the grotesque cactus-like growths previously described.

"Look, Bigelow, see that one there? Now isn't that the exact image of an old lady in bustles and furs?"

I laughed but agreed and pointed out another one that suggested a caricature of a rabbit looking over its shoulder at us.

CHAPTER V

Thirst!

● It was now about three in the afternoon by Mason's watch and we decided to take the western channel, striking north after a mile or so toward the mountain, which showed over the tree-tops some five miles away. We felt we would then have explored the territory immediately south-east of our camp. After a mile the new channel curved north-west, so we were able to follow it almost to the first slopes of the hill, which it skirted, bearing westerly again. Here we climbed the bank and set off through the woods, taking our direction from the sun and a mighty dusty dry time we had of it, for the branches and twigs broke noisily when we touched them and the ground was a fine powder under our feet. We had stopped for a drink to ease our discomfort when I saw Mason's features twisted in surprise. He tilted his bottle slowly upside down. Not a drop of water was left in it.

No word was said, but we kept our eyes wide open all the way back. No slightest prospect of water could we see, however, and it was almost five o'clock when we came to the dry watercourse once more and dropped down the steep bank. We had struck it above Mason's digging and I insisted that we go back and collect the "spear-apples" we had left there—a matter of ten minutes or so. I stuffed three of them delicately into my empty pocket and Mason grumblingly took the remaining three, swearing profusely when he stuck his fingers on the tiny barbs.

Our three companions were gathered around the fire when we came in sight of camp. The smell of broiled meat was in the air!

"What have you got, Haworth?"

"I'm not sure, but I'm going to eat it. Come look for yourselves. I shot it about three hours ago. It rushed out of the woods on the slope of Mount Craig and it was foolish enough to run out into the open."

"'Mount Craig!' So it's been named? Congratulations Jack!"

The carcass of the animal seemed to be about a foot in length and it was browning nicely on the fire—a condition not conducive to accurate observation on the part of a hungry naturalist. The skin and head had been removed and since we saw and shot many others subsequently I may here say that it agrees with no earthly category. It was warm-blooded, but no mammal.

The young seem to be born with a reserve supply of fatty tissue on which they live without eating until they are able to fend for themselves. The mouth has a bony ridge instead of teeth. The nose is huge, covering much of the face with black flaring nostrils, and the eyes are small and deep-set. Ears seem to be wanting, but subsequent examination of many speciments revealed atrophied organs, three in number, along the base of the skull.

We called it the "chickenpork" because of the flavor of the meat, which we found delicious after we had become used to the rather pungent taste. It has two large hind-

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*The nut-bearing shrubs I named **Pseudoquercus Martiana** and these later became one of our staple foods, for Teddy found a variety of ways in which to prepare them—as a potato substitute, mashed; as a flour substitute, ground; and au naturel as a quick, nourishing lunch.

legs and two smaller fore-legs, ending in hand-like paws with which it holds its food like a squirrel or, as need arises, digs after the fashion of a mole. The skin was particularly interesting, for a layer of brown fat, an inch thick, was enclosed between two tough membranes, evidently to keep warmth in during the long Martian winters. There was no hair or fur, but a dry rubbery outer skin, very tough and thick.

We made a splendid meal, though a dry one, for Mason's and Jack's flasks were empty and the rest of us had precious little water left—enough for a swallow all around. As we ate I recounted the discoveries of the day and after the meal I produced the nuts and spear-apples, which Jack doubtfully received at first but after he had spent ten minutes testing them with chemicals and had pronounced them apparently harmless they finally won universal approbation. The spear-apples were particularly welcome at that meal, because of the cool, refreshing pulp.

"If only they were a juicy sort of fruit, instead of pulpy, they'd be a lot more welcome, the way I feel right now," exclaimed Teddy.

No sign of water had been found by anyone.

Jack made his report upon our food supply. "We have two sides of bacon and seventy-eight cans of assorted food," he said. "Twenty-four cans of baked beans, eight of corned beef, twenty-two of tomatoes, eighteen of chicken and six of plum pudding. In addition there are two bags of coffee, one of sugar and three small bags of salt."

Haworth stirred restlessly. "Twenty-two cans of tomatoes, eh? There should be a lot of juice in those!"

Teddy coughed gently from his bed.

"Don't you remember, sir? We had those tomatoes specially put up for the expedition. They were only the meat and evaporated essences of the tomatoes—we had it done to save weight."

Haworth stroked his beard in worried fashion. "That's so. I'd forgotten. Well, it can't be helped. Is there any water left at all? I have half a cup or so in my water-flask."

Teddy's flask was half full, but the meal had emptied all the others. Haworth poured his small contribution into Teddy's container and handed it back to our crippled companion.

"Keep a good watch over it. It may have to last us some time!"

"But there are only two or three cupfuls!"

There was no answer. Indeed, nothing could be said. The sun was behind the western cliff now and the water-course in deepening shadow, except where the firelight flickered eerily. The tent was warm, but the air outside was quite cool and we used wood freely from a great pile we had collected. We spent our second evening on Mars in physical comfort but in mental distress.

What despots are these human bodies of ours! First we must have air of a certain density—and not only that, but of a certain specific chemical formula. In addition we must have definite kinds and quantities of organic material to put in our stomachs and we must have a very limited range of temperatures or we shall either freeze to death or die of heat.

You would think these requirements sufficiently arbitrary? Not at all. To cap the climax we must wash out our systems at frequent intervals with a liquid composed of two parts of the element hydrogen to one part of oxygen! There is no known substitute. It is a constant miracle to me that on the three planets, Earth, Venus and Mars, we had found conditions meeting all these requirements. Such a thing is far beyond the possibility of coincidence. It can only be explained upon the assumption that these three planets are the children of one sun and born at approximately the same stage of their parent's evolution.

● Did I say the three planets met all requirements? I was wrong, for there we were on a planet that offered, in this favored valley, all the essentials except *one*, and for lack of that one . . . . ! The thought of the dry thirsty days which might lie before us was not a comforting thing. "There must be water here," I said to myself determinedly. "Tomorrow we will find it!"

About ten in the evening Bill's Phobian world swung into view low on the southern cliffs. For ten minutes only was the lower portion of it visible, although the upper rim could be seen, I suppose, half an hour altogether. Seeing conditions were excellent, for Phobos was almost entirely in shadow and the flickering pin-point of light that we knew to be the signal of our distant companion stood out plainly.

Mason read it to us:

> "I could throw cans of water down—light fire if you want me to—thank God Teddy safe—is wreck hopeless?"

"Why so be could! Hurry!" and Jack rushed around frantically preparing wood for a signal bonfire. The idea of cans of water from the skies was a tempting one to thirsty men. But Haworth shook his head.

"Never mind, Jack. It can't be done!"

Jack paused.

"Anything he threw down would be smashed shapeless in the first place," continued Haworth, "and in the next place it might hit one of us. But it would be much more likely to strike Mars a hundred miles away. There's no use wasting supplies. Not a chance in a million that anything he threw would land anywhere *near* our valley, even. The thing just can't be done."

So we sat there watching Bill repeat his message over and over, helpless to answer except by a bonfire, for our heliograph was useless at night.

Wearily we watched Phobos vanish from sight and we went back inside the tent and to sleep.

We were all up and anxious to start the day's work by dawn, for our throats were dry. The cool night had saved us from some of the discomforts of drought, but my tongue was quite swollen, despite the cold, and Teddy had a fever. This latter fact ended our last chance of a drink that morning, for the few cups of water then remaining must be saved for our patient. Haworth opened a can of tomatoes, but it had been prepared for mixing with water before eating and was a thick paste which greatly increased our thirst, instead of assuaging it.

"Single scouts today, I think," said Haworth. "Spread out and cover the ground as best you can. We must find water!"

Our camp in the dry stream bed was almost exactly in the center of the valley. From here it was nearly five miles to the huge precipitous walls that closed us in on all sides. The plan was for each of us four to proceed straight toward the towering cliffs and then return. We vaulted the bank cheerfully enough and waved farewell to each other, setting out in an easterly direction, fanwise, to cover such immediate territory as had been omitted from yesterday's search.

In twenty minutes I stopped in my progress through some clumps of Mars acorn shrubs and listened in vain for any sound from my companions. They were already out of sight and I was completely alone. I pushed aside some branches which crumbled noisily into dust at my touch, and went on. The ground seemed absolutely level and was ankle deep in fine powdery soil which stirred up beneath my feet and got into my eyes and nose. What with my already parched throat, I was in exquisite agony before I had gone two miles. The sun was rising higher every minute and the coolness that had been the one invigorating factor in the environment was with me no longer.

Through the dense thickets of dead vegetation my progress was slow and, moreover, even had I been able to move quickly, I had to keep looking about carefully so as not to miss the slightest chance of water. It was hot noon when I came to a short stretch of desert flanking the great three-mile barrier of rock. Either the top of the cliff was swaying wildly in a yellowish haze or else my eyes were no longer trustworthy, I thought. And when I saw a distant line of dry trees dancing slowly upside down I knew that the fault lay with my eyes.

Dry and sere lay the landscape. There was no slightest suggestion of moisture in the air. My head whirled dizzily and my tongue could scarcely be contained in my mouth, so swollen was it. As I looked around I saw Jack Craig come out of the brown woods a mile away. I waved at him, but he did not see me so I tried to call out to him and was horrified to hear a hoarse croaking. It was a second or two before I realized that I had heard my own voice! Jack disappeared without noticing me and I swung about to locate my direction for return. I stood stock still, breathing deeply and shutting my eyes. When I opened them the mountain was clearly in view before me.

Then, as I looked, I saw the faint outline of Phobos low over the cliffs to the south. Bill! *There* was water and food and every comfort! The sight was diabolically tantalizing. Surely, I thought, if he threw down a great many cans of water *one* might fall inside our little valley?

"Bill," I called hoarsely, "Bill, throw me water!" and I waved my arms frantically and began running toward the south, my throat aflame with the burning effort of speech. But in less than five minutes the pale moon sank out of sight and I had sufficient reason left to realize how absurd my actions had been. I plodded on wearily, back toward camp, at least I suppose I must have, though the last two miles were covered without my knowledge.

It is impossible to put on paper any slightest portion of my feelings. I must have directed my course by some sixth sense for I was beyond seeing, hearing, smelling, feeling or tasting. I must have fallen several times, to judge from my cut and bruised condition afterwards. Something was buzzing inside my head and once I remember deciding that the whole valley was only a lid on the top of a lake and if I dug down anywhere at all I would come to water. I came out of *that* madness six feet down in a pit I had dug and my fingernails were torn and bleeding. How long I had been down there I could not tell, but the sun was perceptibly lower and I climbed out and staggered in a generally west fashion until my feet gave way beneath me and I slid down the bank into the watercourse, not thirty feet from camp!

● Jack came over and helped me to my feet.

"Take it easy, Dr. Bigelow. You're done in completely, aren't you? Worse than any of us—'though we're all in pretty much of a state."

I was physically incapable of answering and he helped me in silence to a seat inside the tent. Haworth was leaning against the bank and Teddy was mercifully sleeping. Haworth nodded at Jack, who picked up the water bottle and brought it over to me.

"You can just wet your lips, Dr. Bigelow, that's all there is left."

I raised the bottle and oh, the bliss of that drink! It was over in an instant and so avid was my tongue for moisture that by the time it reached my throat there was none left to swallow. But the relief was immense. Now I could speak once more, even if with difficulty, and I felt sanity return.

"Where is Mason?" I whispered.

"Gone down the watercourse to dig in the hole he started yesterday."

I nodded. I had little hope from that particular excavation. I was so fatigued that I must have fallen asleep for an hour or two, because the sun had set when I looked up again and Mason entered our tiny gully with dragging feet and fell exhausted on the sand. Haworth had the fire going and warmed some beans which we tried to eat. I merely mouthed mine for the sake of the juice and this, thick and pasty as it was, refreshed me. I could by no means swallow any of the solid food itself.

Darkness set in and we lay supinely gazing at the fire. It looked as though we were near the end of our tether. A breeze sprang up from the north and bore to us mockingly the cool smell of melting snow, harbinger of a summer we might not live to see. We watched for Phobos, but whether it did not rise above the cliffs or whether we were too exhausted to notice, I cannot tell.

As I fell asleep I reflected sadly upon this tragic ending to all our hopes. I had a mournful feeling that we would find no water the next day and was convinced that our tortured bodies could not support another twenty-four hours without water. The night was blessedly cool, but such a dry coolness that it helped little. If one could only *drink* cold air, I thought, and tried it, but the resultant sensation was that of a tongue and throat drier than before.

Would they think of us back on earth? Not for months or even years, I realized. I found the scene of our departure was very vividly in my memory: I had gone to a window the morning of our departure and such a sight as met my eyes! I have seen, before, several great gatherings of men and women, but never such a one as that. There in view of our window stretched a compact mass of humanity back to the crest of the hill two miles away that marked the end of Haworth's estate. Two blue ranks of Marines held the foreground and made a neat margin for this sea of humanity to beat upon. The people were closely packed and, even allowing for trees (which mostly had a boy or two in their branches), I believe there must have been a person on every ten square feet of earth. I could not be looking at less than a million people, all come to see our departure.

It had been breath-taking, beyond any previous experience of mine. I remember going from window to window, in Haworth's residence, peering through each in turn. Here, I could make out individual families, fathers and mothers constantly turning to speak to squirming offspring. There, on a boulder stood a minister in clerical garb, peering at our space ship beneath upraised hand. In an ash tree far away four boys were quarreling over the choicest branch, finally compromising the matter by all four sharing the perch and sitting like young birds in a row until they were presently joined by two men who purchased their rights of priority with coins. White-aproned hawkers of frankfurters and peanuts did a thriving, pushing business and there must have been thousands of policemen and state troopers continually threading the throng to maintain order.

I had passed more than an hour in absorbed contemplation of that spectacle, Jack Craig joining me during the end. Presently I looked at my watch and observed that it was half an hour to starting time. From that moment the time had seemed to precipitate itself into a quick-moving cataract of action. Mason had interrupted our excited conversation with the announcement that we were due to leave in two minutes. We proceeded in a compact body to the door and into the full view of the multitude.

In the sudden silence we walked quickly in single file up the inclined platform leading to the space ship's entrance. Haworth had come last and when he turned in the vestibule to give a last look upon the earth, he raised his arm in a gesture of farewell. I could almost hear, as I lay there and recollected the scene, the vast murmurous cheer that had followed. It was like the breaking of giant combers on the coast of some mythical continent. Our leader had shut out the last sight and sound with a sonorous clang, as he closed and fastened the air-lock door.

And presently, I supposed, when our power was turned on, these good people had seen our ship flash roaring into the sky and disappear. After we had been gone a year, there would be questions in public and after two years all hope would be abandoned for us.

And Bill, anxiously waiting our return to the *Asteroid* on Phobos! Poor man, after a month's failure to receive any answer to his signals he would suspect the worst. Faithful friend, he would undoubtedly bring the *Asteroid* down to Mars and, provided he landed safely, would have our dead bodies and his own eternal prison here for reward. The irony of our whole predicament was, what made it worst of all, that we were quite convinced that it could not be many days before the spring floods would start pouring down the Martian valleys quickening the vegetation to succulent life. But as for us, we would not be alive to see it.

As I lay there a troubled sleep came upon me and I dreamed of cool sun-speckled brooks and crystal-blue mountain lakes. But in my dream a black bird flew over the water and uttered a mournful cry, whereupon the brook ran dry and the lake was changed into a sandy desert.

CHAPTER VI

Flood!

● I cannot write coherently of the next day. My senses exaggerated all impressions into a meaningless jumble that is very hard to translate now. For instance, the sun seemed to leap boldly into the sky and burn there, trembling with fury. The great cliffs all around us danced and vibrated and my head throbbed with the painful pulse of my heart. Breakfast was not even attempted. Speech was nearly impossible to our swollen throats. Jack stood looking somberly down at Teddy, who lay in a light delirious slumber in the shade of the tent. Haworth's drawn face quivered as he stared slowly about him. He finally raised his arm in a sweeping gesture.

"Must find . . . . water . . . . today!" he croaked.

We nodded dumbly and set out blindly, stumbling over slight obstacles. Mason and I went down the watercourse until we came to the pit where he and I had been digging two days before. Here Mason stopped and picked up a spear-apple branch. He lowered himself slowly into the excavation (now some eight feet deep) and commenced digging, obstinately and doggedly refusing to look up at me again.

I went on alone. The sun was higher now—it must have been about ten o'clock—and the heat shimmered slightly on everything distant. After half an hour this phenomenon became more pronounced and things nearer to me became vague and vibrant as I looked at them. At first only such objects as the cliffs and tree tops had partaken of the shimmering; then an occasional tree nearer to hand joined in; then the shrubs on the very bank of the watercourse beside me; until finally my very being joined in the jittering dance and madness crept over me like an anesthetic.

From then on I recollect only occasional indistinct visions. Somewhere there was a man who wanted something—wanted it badly. What was it he wanted, though? I puzzled over the problem for uncounted time. Oh yes! It was a drink of water. Well, why didn't he go get himself one at the nearest tap, instead of bothering me with it?

I must have been walking all the time and have covered miles of country, for I once came face to face with a three mile height of rock and tried to climb it. Or was that me? Hanged if it wasn't that man again! "Funny thing," I remember saying to myself, "there he is wanting something else now! Why doesn't he turn around and walk the other way if he can't get over the cliff?"

Then I got into a state of being where my eyes and the brain behind them seemed to be my own. The rest of my body I could neither feel nor sense in any way. My eyes seemed to be standing still and things moved at them. Trees moved toward me, slowly and jerkily, as though they were walking. The landscape moved by on both sides like the frothy current of a slow-moving stream slipping steadily past an upthrust rock. I was afraid something would attack me, but they always moved to one side or the other when they got really close. Finally one did come right upon me and I struggled with it fiercely and felt its branches crumble to powder beneath my weight.

The scene changed gradually until no more trees were in sight. They had all marched past. Now approaching was a level area of sand, but I looked upon it with sudden fear, for strange animals and grotesque creatures inhabited this dusty plain and they were moving upon me even as I looked. They were scattered thinly over the open area and it happened that I was not in the path of the foremost ones, but rather to one side.

But two hundred yards ahead of me glided onward a fantastic beast with two heads and a lopsided jaw. Like a thing in a nightmare it came closer and closer and I felt in sudden panic that it would not step aside when it came to me. I tried to step backward but had no control over my legs—in fact I believed I had no legs. My mind desperately tried to form a plan, but without any body, what could it do? Now the monster was within three yards and towered well over my head. With a fear-born wrench of will I found body and limbs just as it crashed into me!

My arm unsheathed the knife at my belt and I plunged it into the soft leatherp body again and again, in a very fury of cowardice, brain whirling, breath panting and eyes glazed over with a red pulsing mist. I could feel claws penetrate my skin, seemingly from a hundred directions at once. Then a great coldness came in my shoulder and spread down my body. I remembered no more.

I have tried to put down on the paper before me the events just as they happened. As I read it over I must confess it makes very little sense to the eye, but reader! As it happened to me it conveyed even less meaning. I went through all the sensations of having been attacked by a monstrous inhabitant of a weirdly inimicable and motile world. Then I fainted.

When I awoke the sun was low on the horizon. My tongue was a flaming sword set in a tortured throat. But my belly was cool and—could it be?—*damp!* Had I been bleeding? The landscape no longer danced and shimmered, but lay quiet and clear about me. I was in the desert area to the north-west of our valley. Lying across the lower part of my body was skin and pulp slashed from one of the cactus-like plants which grew here and there in the sand all about me. Wearily I wondered at my past madness and whether this lucid clear-headed interval might be the prelude to death, for I was weak and parched. You will scarce credit the statement, but I lay there full five minutes before I noticed that the pulp of that plant was dripping wet!

A piece of it lay over one leg and I reached down and tore out a squashy handful and touched it to my tongue. But there was no taint of poison nor any slightest odor at which the most fastidious person could have cavilled. It was pure sweet water and I squeezed my hand convulsively to let it trickle over my mouth and onto my protruding tongue. Oh, the bliss of that feeling! I was up and frantically tearing off piece after piece and not until the entire portion of the cactus lying beside me had been exhausted of liquid did I cease my delirious slobbering.

I was a new man. Now I could laugh at all that had happened to me this day. Here was water provided generously—nay, miraculously!—by Nature. We were saved! And with that I began to think of my companions and with ill-controlled impatience I placed the water-flash between my knees and squeezed it full of water from a great section of the plant which I hacked off with my knife. Full, now, of strength and joy I set off for camp, half walking and half running. It was three miles and as I ran I wondered whether I might not even now be too late. I had myself been near death, of this I was convinced. How had they fared this terrible day?

● Presently I came to the familiar bend in the watercourse and saw our tent and piles of supplies. Mason and Jack were lying motionless on the sand beside it. I bent over first one and then the other, pouring just enough water down their throats to thoroughly moisten them. I turned to Teddy, to find him awake and sane, although terribly weakened. By the time I had given him a small drink the other two were on their feet, staring wildly about them. I doled out another drink to each, which revived them in the most amazing manner. One minute they had been lying there unconscious and hopeless; the next, and they were strong men once more, with bright eyes and smiling features.

"Where did you get it?"

"Where we can get as much more as we wish!" And I told them of my chance discovery. We were felicitating ourselves on our salvation when I remembered I had not yet seen Haworth. I asked where he was.

Mason and Jack looked about them surprised.

"He came back once, I remember that!"

"It seems to me," said Jack, frowning in the effort of recalling something long forgotten, "that I saw him go south down the watercourse . . . when was that? . . . Oh Lord, I can't remember. But it must have been within the last hour or two."

"We must find him at once!"

And as we started, leaving Teddy anxiously looking after us, the sun set in a feeble crimson display. Darkness and the stars followed almost instantly. We halted and Jack returned for some torches of dry wood.

"But how shall we guide our direction in the dark," I asked. "In daylight we can go by the position of Mount Craig, but at night we can't see that."

"We will use the stars," said Mason.

"The same as on earth?"

"No. Polaris is the north star on the earth. Here we must use Deneb for the same purpose. See it there? The brightest star in the constellation Cygnus."

Upon Jack's rejoining us with the torches we set off once more. The moon Deimos rose in the east and its tiny gleam aided the bright stars to dispel the gloom that lay over our valley. When we came to Mason's abortive well we lit a faggot to peer down that twelve foot cavity. It was empty. We set off again down the watercourse. For miles we tramped fruitlessly, calling Haworth by name and shooting off our revolvers. We were facing failure, but dared not admit it. Our last faggot was half burned and Jack slowly extinguished it in the sand.

"Of course, the nights are cool," he said.

"If he is alive now he will certainly be alive in the morning," I agreed, feeling all the time that this was not so, but not caring to say the fatal words that would end hope.

"We might as well get some sleep so as to be up at dawn," said Mason.

Sadly we started to retrace our steps when we heard a shot. It seemed to be just over the bank of the watercourse and we quickly clambered up and stared about us but could see nothing except shadows in that darkness. Jack relighted his half-burned torch and we covered the ground in circles. We came upon Haworth finally. He was leaning against one of the very plants which had saved us all!

He was only half conscious and his revolver was still in his hand. He evidently had not had strength enough to replace it in his belt. It had been five minutes after our last signal that he had fired his answer, I thought, and I wondered what horrible depths of exhaustion and privation could account for such a delay. He afterwards told me that it had taken all that time for him to reach his hand to his belt, extract the weapon and pull the trigger!

I slashed a great chunk of the plant from directly above his head and squeezed a very showerbath on his upturned face. What a miraculous thing is water! What a potent medicine! What a luxury and a necessity combined in the one heavenly fluid! By the time Jack and Mason and myself had squeezed our four flasks full (we made a sort of funnel out of a section of the tough rubbery skin) Haworth was ready to go back to camp with us, walking on his own two legs!

I may say here that the "water-bottles",* as we called them, were natural reservoirs of water. The whole inner pulp, beneath the protecting skin, was a cell-mass filled with tiny liquid globules. I am not ignorant of the fact that such a plant also grows in the Great American Desert—on the contrary, I am well acquainted with this earthly species. The Martian plant is totally dissimilar. No naturalist would have thought of ascribing the same properties to both, merely judging from appearance.

There was little sleep that night. Every few minutes one or the other of us would rise and sip luxuriously from his flask, smack his lips, sigh and return to his place on the sand beside the fire.

"There is something queer about this valley," Mason pondered aloud. "It is too much of a coincidence that everything we need to support life should be so readily and providentially to hand!"

I was too delighted for philosophy—so were we all. There beside the cheery blaze we sat in great joy and peace of mind until almost sunrise. Then we rolled up and fell asleep in such content as do men who have faced death and been granted a reprieve. The last thing I remember was Mason dreamily continuing his train of thought:

"What a valley it is! Food grows in various shapes on trees, and water is stored for our use in plants. If someone had planned everything in it with a view to sustaining life, what more could be have put here than we have found . . . or may yet find? No animals except the chickenpork—and he is almost suggestively toothsome. Were they planted here, too? No insect pests—in fact no insects at all. And that's strange, in a way . . . "

And now for the irony of life. We were awakened in mid-morning by a *flood!* We started up in three inches of icy water and got to our feet in vast stupid surprise and watched the depth increase for a full minute before we thought of rescuing our supplies.

Then there was a frantic ten minutes in getting everything—tent and all—up on the ten-foot bank above us and once all was safe we ran, shouting with joy, along the watercourse, watching the water become steadily deeper.

"The ice-cap has melted at last!"

"Since we wouldn't die of thirst, this pleasant fellow Mars is bent on drowning us!"

"What price a bath?"

And *that* thought met four willing minds. We stripped and plunged into the flood with gasps of shivery delight at its extreme coldness, while Teddy looked on smiling from the edge of the bank above. We dressed rapidly and at Haworth's suggestion occupied all that day in throwing down the bank at a deep and narrow part of the stream to make a partial dam over which the water rushed steadily as we worked.

"At least it will hold *some* water," said Jack, "and one cupful is worth a whole ocean when you haven't any."

The flood kept increasing and when it reached almost to the top of the bank Haworth ordered a general retreat back to the slopes of Mount Craig. We loaded ourselves to the utmost once again and trekked in the late afternoon through the still dry and crackling underbrush, carrying our entire possessions with us. In half an hour we reached a spot halfway up the mountain's lower slope and stopped in a level crevice that was buttressed on two sides with rocky walls. We dumped our loads, pitched our tent and, as the sun set, started a fire of dry branches from a nearby clump of trees. In celebration of that glorious day Mason broke out a can of plum pudding from the stores and we boiled water for coffee in two of our bean-tins and allowed ourselves a five-minute smoke all around!

We watched in vain for Bill that night.

"At least he knows we're all alive," said Teddy.

"Yes," agreed Mason, "he'll be able to see the spring freshets running down the valleys all over Mars, so he'll know we have water."

"I should think he'd have worries enough of his own—marooned by himself on a tiny world—airless and uninhabitable—with no prospect except eventual death when his supplies are exhausted!"

"He might bring the Asteroid down to Mars here."

Haworth nodded. "He could do it, all right, but he won't do that except as a last resort. It's up to us to repair the *Planetoid* and get back to him—somehow."

We laughed at what we took to be a joke, but Haworth shook his head.

"I mean it," he said.

The morning of our sixth day on Mars dawned brightly, although "dawn" for us came about nine o'clock in the morning, for our rocky shelter faced west and the early sun did not waken us as heretofore. When we rolled out of our blankets the thermometer read seventy degrees in the shade. Two white clouds floated in the deep blue sky and a faint breeze stirred warmly. But our waking eyes were attracted chiefly by the level glistening sheet of water which covered all the bottom of the valley. It shone bravely in the sunlight and invited the four of us to a morning dip. We brought back a rubber space suit filled to the neck with water and poured it over our recumbent Teddy to his immense delight. When he was partially dried again he lay there luxuriously and talked to Jack enthusiastically about the valley.

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*The "water-bottles"—being a distinct genus—I have names Haworthia aquael in honor of our leader and of the plants' peculiar properties. Its skin proved to contain a high percentage of rubber in rather an available form. It melted readily in acetic acid and when the solution was decanted and dried, it proved to be rubber of sufficient purity to use without further refining. However, our supply of acetic acid was too minute to make use of this discovery.

"If only old Bill were down here with us, what a paradise this would be! Every blessed thing we could possibly need is right here to hand. All we have still to do is to dig a well and make a permanent supply of water to take us over the dry season."

"How about winter?"

"Oh—we could build a stone house and burn wood to keep us warm.

Jack nodded half convinced and stared out over our little domain, sniffing the air contentedly. Mason, meanwhile, had stepped out of sight along the side of the mountain and presently we heard two shots of his revolver. I rushed toward the sound and observed him holding up a chickenpork very proudly to my view.

"There are hundreds of them on the hillside here, Bigelow. The flood must have driven them up. We shan't have any trouble finding food for a while."

And thereupon, we all having huge appetites by this time, we set about preparing breakfast to match. When we had got ourselves outside of mashed acorns and broiled chickenpork with bacon, topped off with a "cup" (tin can) of coffee apiece, we felt ready for anything!

"Since everything else is flooded, I suppose we had better confine our investigations to Mount Craig today," I suggested. "What is to be done there, Haworth?"

"Well, I should like it explored pretty thoroughly and we should climb to the top to see what is there. Then I want to plan out our future work and make a more permanent camp than this provides. I'd like you to go on the exploring party, Bigelow, and see what you can find in the nature of timber trees. Better take a hatchet along. Also try to find some common plant with a good fibre for making rope. Jack, you'd better go along with Dr. Bigelow and keep *your* eyes open for traces of iron, sulphur and—above all—clay."

"And I?"

"Stay at camp with me, Mason old man. There'll be lots of jobs here."

"But what have you in mind, Haworth?"

"Simply that we cannot remain in this valley the rest of our lives."

"And just how will rope and sulphur and timber get us out of here?"

But Haworth shook his head and looked very secretive. Knowing him of old, and having good reason to trust blindly to his leadership, I called Jack and started off up the mountain, leaving Mason still arguing vainly for enlightenment.

As I have said, Mount Craig is almost a mile in height and our camp about a quarter of the way up. We decided to ascend to the top in a direct course and plan out our exploration from there. The lower slopes had been covered with vegetation of varying kinds, but this thinned out rapidly as we ascended and the rather thin soil was only sparsely covered. Upon examining one of the shrubs I was surprised at its extreme dessication. The branches in the valley below had been dry enough, but these crumbled to powder much more readily.

"It doesn't look as though there had been life in these plants for years," Jack remarked. And at his words a vague relief came into my mind, for I had been wondering how high the flood might rise before the polar icecap was completely melted. Hastily I examined the shrub with more care and even pulled it from the rocks and powdered earth which held its roots. It was so noticeably different from those in the lower levels that I was forced to the conclusion that it had not been touched by water in recent years—perhaps for centuries.

"But the water must have come this high once upon a time," I pointed out, "or else it could never have grown here."

CHAPTER VII

Signs of Life?

● We climbed up for half an hour and found ourselves at a height where no vegetation at all was to be seen. The slope was now quite steep, though fairly regular, and crumbly weathered rock formed the surface of the mountain side. We judged we had ascended within four hundred yards of the flattened top, now clearly visibly overhead. It was warm work and the air was noticeably thinner, causing us to draw great panting breaths. We could see half the valley floor from there and it was all covered with water, though not to any great depth for even low bushes and trees protruded from the surface in most places.

The last hundred feet was almost sheer cliff, but fortunately it was plentifully fissured with cracks. We found one such crack up which we could easily make our way. It was from two to three feet in width and hand-holds were plentiful. Completely out of breath we lay at last on the flat peak recovering ourselves. When we were able to get to our feet we had a magnificent view to reward us. I had brought pencil and paper and made a sketch of our valley, noting particularly areas that seemed heavily timbered. I noticed one spot, right at the foot of our mountain on the north, where a roughly circular gap appeared among the trees. All around it the bare branches projected above the surface of the water, but from our height it was possible to see that this spot was very much deeper. I decided that it would be well worth investigating.

Further off we observed the watercourse which had ushered us into the valley. A great two-mile cascade was now flowing over the rocky slope. It was a beautiful sight. Spray and mist clothed the barren rock with charming lively plumes and a muted roar was thinly audible even from four miles away.

As we turned our gaze south Jack gave an exclamation and pointed. There, just setting, was the moon Phobos. It was very faint against the sunlit sky and appeared to be in darkness except for one thin edge. From its position we judged it had been visible for more than half an hour from this elevated point of vantage. We were helpless to signal Bill, of course, even had he been watching for us. Jack thought he could make out a faint flicker of light, but was not sure and I could see nothing of the kind at all. It vanished from sight and we stared after it, thinking of our lonely companion.

The hour was close to noon by now and we ate the lunch we had brought in our pockets, washing it down with water from our flasks. We took occasion for the first time to examine with any care the narrow plateau on which we stood. It was a full hundred feet across and level as a table. The surface was minutely fissured and worn smooth with the elements. The color was a uniform shade of dark gray.

Absolutely nothing grew at this height, of course, except some tiny tufts of lichen-like stuff near the southern edge. The only break in the flat surface was near the center where several large rocks were piled. We made our way over to these and Jack seemed unduly interested. They were about five feet long and two feet square and were unusually regular in general shape, perhaps, although their rough and rounded edges and weathered surface seemed to me at first glance to indicate their natural origin.

"For such a thing to happen once might be all well enough," said Jack finally. "But there are, let's see—five, no six of them. And . . . . Lord above! Broken aslant the grain!"

"What are you talking about, Jack?"

"Why don't you see? These rocks didn't come here by themselves!"

"No? How then?"

"Some thing . . . . man or beast . . . . put them here!"

He was tugging at one of them as he spoke and, strong as he was, found it too heavy to move. I lent a helping hand and together we succeeded in lifting one end and throwing it heavily to one side.

"These stones have been cut to shape, Dr. Bigelow! I have a feeling that we are on the verge of an immense discovery. Come, help me get them moved and let's see what's beneath!"

I was excited enough by now myself. We tugged and pulled mightily, gasping painfully for enough of the thin air to fill our lungs. The fourth stone we rolled away revealed a hole beneath and when the fifth was pushed to one side our bulging eyes gazed upon a narrow passage cut down through the rock in the form of descending steps!

The evident antiquity of the stones removed any slightest hesitation we might have had and we hastened down, finding scant headroom and inconveniently small steps. The descent was only some twenty feet and light penetrated from above sufficiently for us to observe the bottom. We stood in a circular chamber cut in the rock. It was roofed with a flat arch of stone and was about fifty feet in diameter. It was several minutes before our light-accustomed eyes were capable of seeing through the half dark, but presently we spied an arched doorway on one side.

We made our way toward this, our feet falling soundlessly on the accumulated dust of centuries. Beyond the arch was a passage and a glimmer of light could be seen at its far end, where we came to another chamber, similar to the first. But along one section of the circular wall were four narrow windows cut through to the outside. Peering through these, we observed the southern portion of the valley stretched out below us. There was enough light to make some examination of this chamber but we found the floor absolutely smooth and the dust lay level and unbroken over it. On the walls, however, were carvings and these we studied with awe and wonder. The band of carved work ran completely around the room at about breast level. At the first glance I uttered a shout of surprise, for an amazing group of animals and planets and symbols and trees met my eyes.

My voice echoed weirdly in the confined space and we spoke thereafter in whispers, as though we feared to wake some sleeping guardian.

"This will have to be studied carefully."

"Must be terribly old!"

"Old! It may have been abandoned before human history started down on the earth. Perhaps before the first ape-man swung down from a tree!"

● We returned to the first chamber and found its walls were similarly decorated. At a point opposite the southern passageway we came upon a companion arch and felt our way through it and along a passage in darkness to come into another chamber of about the same size as the other two. A faint crack of light was observable in the far wall and upon going over to this we found that a portion of the roof had fallen in and covered up what had evidently been a series of windows on the north. We could feel, however, that the band of carvings was here as well, although it was much too dark to see more than a vague suggestion of what they represented. Search and feel as we might, that was all there was to be found. We made our way back to the stone steps and up into the blinding sunlight once more.

The spell of our discovery made us sober and thoughtful. What did it all mean? There must at some time have been reasoning creatures in our valley. They had gone ages ago from this place. Where had they gone? Were they perhaps now living in some other part of Mars? What did they look like? All these were questions to which we had no answer.

"We must come back with some lights and copy these carvings," I remarked. "Oh, for my camera and some flashlight powder!"

On our way down we spent three hours searching the hillside with great care, but Jack was totally unable to find any trace of sulphur. "Moreover," he pointed out, "it isn't likely that it will be found in our valley. There are no signs of even ancient volcanic activity—and that's the most likely source of sulphur, you know."

He did, however, find some ferrous rock, though he was not enthusiastic about the possibility of its proving a rich ore. I was more fortunate in my quest. We had descended almost to the level of our camp, some mile or so to the south of it, and we had been passing scattered shrubs and trees with some frequency when we came in sight of one of the most extraordinary trees I have ever seen. The weeping form of *Fagus sylvatica* on earth may give some slight hint of its general outline, but in that the hanging branches are coarse and woody. My new discovery had branches tapering off like whiplashes to incredible lengths, fifty feet or more of fine tendrils being not uncommon. There were no leaves, of course, but I named it *Pseudofagus filifera* on the spot and running up to it, seized a string-like branch (or twig as it might be) to break it off. To my surprise I could not do so. The material was unbelievably tough and pliant, even though the bark of the trunk itself was dry and dusty. Several lengths were readily severed with my knife, however, and these we bore back to camp in triumph, together with a pocket full of Mars acorns from chance shrubs we had passed on the way home.

We rounded the buttress of rock and came in sight of our companions. They had evidently been hard at work, for a great pile of firewood was beside the tent and our five space suits had been hung from their necks on a tripod of stout branches. They were full of water, and bulged out to look like so many headless humans. Mason hailed us and pointed at them in high good humor.

"Haworth feared the water might leave this valley before he can dam any of it up and decided to make sure that some was saved! We can always use these for Teddy's shower baths if we don't need them after all."

Haworth was attending to the preparation of our meal and Teddy was still stretched out in the tent, with his leg attached to a heavy stone as before. Our news was told to an astonished audience and it was instantly agreed that on the morrow we would all go up to the top of Mount Craig with matches and torches, taking along our mirror to signal Bill while we had the opportunity.

Haworth's eyes were shining and Mason's hard-clenched jaw indicated his emotions over our almost incredible discovery.

"But think of it! The whole world will be amazed at this news!"

"There can be no question," I said, "that the caverns were carved by intelligent, civilized creatures. What difference does it make whether they may not have been identical in physical structure with ourselves? That indeed would be a coincidence almost unbelievable, nor is it to be expected. But whatever they looked like they must have thought and acted very much as we do. No doubt they sat in this valley and gazed up at the stars and planets in the sky overhead and wondered whether any of them might be worlds like their own and whether creatures like themselves might not live on such worlds—on the earth for instance."

"And no doubt they would have been wrong if these creatures lived so long ago as you seem to think," said Mason, smiling, "for in those days the best that the poor old earth could show would be some hairy ape, blinking at the moon and wondering perhaps if it were good to eat."

I wonder now that we did not think of the possibility of these intelligent creatures being now alive somewhere on Mars—perhaps in our very valley. But there was something inexpressibly sad and final about the appearance of the ruins we had seen, which spoke mutely of things far away and long ago. I remember wondering, as I fell asleep that night, whether this was the fate which the human race in its turn might expect—to be one day no longer even memories and our works and buildings only mysterious markings on a lifeless world circling meaninglessly in eternal space.

As may be imagined, we all of us looked forward eagerly to a more complete exploration of the caverns in the morning. Teddy was disconsolate at being left out of it, but we consoled him with the thought that someone had to look after the camp.

Haworth heard the report of our findings in silence and examined the stringy branches of my "thread-tree" (as I called it) carefully.

"Now that we have this, we won't need the iron anyway, Jack," he announced mysteriously—though what connection there could be between the two was more than I could understand. I showed him my sketch from the mountain top and he agreed that any exploration of the valley's possibilities must wait until the waters had subsided. He seemed quite thoughtful about our failure to find any trace of sulphur.

"I had hoped this mountain might have been volcanic. Well . . . if you didn't find it up there it won't be found elsewhere in this valley. Let's see, then we'll have to use the natural method . . . umm . . . "

"For Heaven's sake," I cried, "Why must you be so mysterious? Can't you tell us what this is all about?"

But he refused, as usual, and supper cut my argument very short indeed, for we were sharp set after our strenuous day.

The next morning we left Teddy to amuse himself as best he could and all four of us made the journey up Mount Craig. I found time to copy with exactitude about fifty running feet of carving. Haworth and Mason were as impressed as we had been with the remote antiquity of the chambers. Mason studied the various aspects of the stone stairway with great attention.

"They were two-legged things, about four to five feet high and not very thick through—something like the general proportions of a human, perhaps. Their skin was probably thick and leathery—or perhaps rubbery—and they understood and worked in metals and very likely could fly, or else had flying machines. But above all, of course, they were agriculturists and could breed and develop new and useful varieties of vegetation with marvelous success. They were also . . . "

" . . . . pure figments of your imagination," I interposed. "How could you possibly tell anything at all about them!"

"The statements I have made are elementary, my dear Bigelow, as you would realize if you had read your Sherlock Holmes thoroughly. They were two-legged because they built steps. A three- or four-legged animal would have been more comfortable on an inclined ramp. Their height is axiomatic if you consider the height of your carvings and the ceiling of this stairway. They must have worked in metals—in fact, all their equipment must have been metal—for had it been stone, then some of it would remain even after the lapse of thousands of years. And it could not be that they used wooden tools to carve this hard rock, could it? The top of the hill is suggestively levelled for landing a flying machine, but aside from that altogether, unless they had some means of flying they would hardly live a mile above their source of food and water in the valley below. Why should they climb that back-breaking distance every day?"

Haworth started visibly and scratched his head. "Just suppose," he said "that they were afraid of something that lived in the lower levels."

● His words brought a new train of thought to my mind, affected as it was by the tokens of long departed life all about. I had spent the morning copying and studying strange and impossible images from the walls and I glanced with a shudder at one symbol that had occurred several times. It was, to my mind, unmistakably suggestive of a *moth.* The point about it was simply this: The ancient sculptor had graved the insect the same size as an engraving of a Mars acorn shrub! Without words, we turned simultaneously and made for the air and light above.

Outside the sun shone cheerfully enough and Mason gazed southwards, looked at his watch, and sat himself down with the mirror, set now in a light frame of wood fastened together with wire. It was not five minutes (we others had started eating lunch) when Phobos came partially into view. She was sunlit only on the upper rim and Mason quickly aimed his reflected sunbeam against the cliff below her, then raised it and commenced signalling. Meanwhile, Haworth had stepped up beside him and held a short length of straight copper tubing to his eye. I could not see the faintest flickering of light on the pale image of the little moon, but Haworth with his eye-tube evidently could for he began to repeat the message out loud.

> "Planetoid—can you see me—planetoid can you see—I get your signal."

And then Mason started sending, speaking the message so that we all could hear:

> "Have food water and air—all well—by all means you remain on Phobos—conserve fuel asteroid—some hope we can join you—will signal when able."

By now Phobos was close to the cliff top and evidently Bill feared we might not receive a longer message—at all events his answer was complete though brief:

"O K!"

And his little world disappeared from sight.

You may suppose we plied Mason and Haworth with questions as to what "hope" there was of our "rejoining Bill" on Phobos, but Mason replied that we knew as much as he did and Haworth said that he had an idea and would tell us about it later.

We finished our lunch and spent a moment gazing down upon our valley from this mountain-top observatory. It seemed to me, looking northward, that the flow of water down the cascade was much diminished. I mentioned this to Haworth and Jack who agreed with me. The whole valley bottom was now one great lake and all but the really tree-like growths were covered with water about six to eight feet deep. The air was noticeably damp and half a dozen small gray clouds were visible to the west and a cool breeze had sprung up, sufficient to make us chill in spite of the strong sunlight.

The rough work of descending soon took the chill off and made us perspiringly warm. In two hours we were at the camp and greeting Teddy and telling him all the events of the day. Dear boy! I can see him now, face all smiles and lean brown hand waving us welcome.

Haworth announced that there would be an early meal this evening and a conference as to ways and means following that. We hastened through our meal and sat about the fire expectantly, keeping our group close to the tent so that Teddy could be one of the party.

"We cannot remain here forever," said Haworth, "and the only way of returning to earth is to first get back to Phobos. If Bill should land the *Asteroid* down here, for instance, we would find she had not sufficient capacity to lift us off Mars. Her power is enough just to leave Phobos and return thence to earth—and even that only when Phobos is travelling in the right direction at her speed of one third mile per second. Nothing, therefore, remains as even remotely possible except our return, somehow, to Phobos."

"But Haworth, our little *Planetoid* is wrecked."

"I know. But we must repair her. If we could get her down here in the valley where we could work on her we would soon have her spaceworthy again."

"I suppose we could—but her liquid oxygen is all evaporated."

"Then we must substitute liquid air. It will not be as good, but the loss of efficiency will be small for the Martian atmosphere has a fair percentage of oxygen, after all. There are no insuperable obstacles, merely difficulties which we must overcome."

"Have you considered the chance that her gasoline fuel may be all gone?"

"Certainly. We can readily substitute alcohol. That we can make by fermenting any starchy vegetable matter and consequently distilling it."

There was a period of reflective silence. His words were plausible, but the program verged close upon the fantastic.

"The first job," he continued, "is to get the *Planetoid* down here from the channel above. Her weight on earth, loaded, was ten tons. Of this her payload was one ton (750 pounds of human beings and 1250 pounds of supplies). We have taken with us quite a heavy lot of stuff, as you may remember if you think back to the time we brought it down into the valley here. I estimate that not more than one-third of a ton of supplies remains in the vessel, reckoned in earthly measures. Her fuel, we suppose, is completely gone and this represented eight out of the original ten tons. The total weight of the *Planetoid* today cannot be more than one and one-third earthly tons—or possibly one and a half. Now on Mars, this weight amounts to only half a ton, so far as the actual moving job is concerned, due to the lessened gravity here. There are four able-bodied men to lend a hand. That figures out only 250 pounds per man. Surely that is not impossible."

"But how will we breathe up on the valley above?"

"I have solved that problem I think. It will take several days' work to make sure. I'd . . . I'd rather not tell you about that until I can, er . . . try it out."

"But won't we be too late anyway to return to the earth," I asked. "She circles the sun twice as fast as Mars does and it will take two years for the two planets to again reach a favorable position for the voyage back, as I understand it."

Mason shook his head. "No, Bigelow. We had planned for several week's stay on Mars. I have return courses charted for three, four, five and six week's stay after our arrival here. It has just been about one week now, or ten days counting the time we spent on Phobos. If—I repeat, *if* everything goes along as Haworth suggests and it can be finished inside of five weeks from now, we can make a shift to plan a safe return."

Teddy frowned and drew circles with his forefinger in the sand. "Don't want to be officious, sir, but isn't there a good chance all this will fail? Have you plans in case we can't make it in time?"

Haworth looked at him approvingly. "I have. But first, is it understood by all that we will make the attempt and work ourselves as hard as we can to succeed? For the alternative is not pleasant!"

We all nodded and assured him of our cooperation.

●

"Well then," he continued, "it can do no harm to tell you: We would have to signal Bill to move the *Asteroid* to the pole of Phobos, where it is least exposed to the heat of the sun and to use the very minimum of fuel and oxygen—but even then we'd run her fuel and supplies desperately short! I much prefer to hope that we shall succeed in refueling the *Planetoid,* even if it be too late to return to the earth this year. In that case we could go up to Phobos, put the *Asteroid* in "cold storage", so to speak, and bring Bill back with us. Then at the proper time, later, we could once more fuel the *Planetoid* and return to the *Asteroid* for our voyage back to earth."

"And what would we do here all the long winter—twice as long as on earth?"

"Dig a cave beneath the ground and collect enough wood to keep it warm and enough food to keep us alive."

"And water?"

"We should have to make a reservoir which would freeze over and remain all winter. But it would not be a pleasant life. The temperature would be never higher than sixty degrees below zero (Fahrenheit) even at midday, in all probability, and at night it would get fabulously cold. We would have none of the comforts of the *Asteroid* and about all the discomforts that can readily be imagined. No, winter would be not a season of joy! It is true, we would in such a case have the rest of the long summer now commencing in which to complete our explorations and studies, but after all, our expedition was never planned nor equipped for that sort of work.

"We are mere pioneers and our duty is to discover the way and prepare the means by which Mars may subsequently be explored or made habitable, whether permanently or temporarily. Now that we know this valley to be habitable, an expedition can be equipped to land here and start up alcohol distilleries and oxygen refrigerators to create the fuel for its own return. That can easily be arranged; the *Asteroid* could have done it if we had not discarded our second 'step' in space, but had brought it here instead for refueling. Rocket trips over the entire surface of this planet for further exploration can easily be made with this valley as a base of operations.

"No doubt other spots will be found, quite possibly better ones than this. Although no important metals or minerals have been discovered in this tiny valley, there is no telling what valuable finds might not be made elsewhere upon proper investigation by a well-equipped party. These things will now be possible for mankind in the future, but not for us. Before one winter was half over we might be sorry we had ever been born!"

"Just the same," put in Jack, "now, during the warm weather, this valley is a very paradise. There's no denying that!"

"And perhaps," I said, my mind on certain vague fears, "even this paradise has its serpent. We have been in it less than one week . . ."

"What do you mean?"

"We have found vegetable life and animal life—but no insect life," I replied. "Suppose you visited New England in late February and stayed there one week. You would think you knew the countryside pretty well, wouldn't you? But you would never suspect hibernating bears nor insects nor the fact that trees had leaves nor—oh, dozens of similar things. Personally, I agree with Haworth. The sooner we can get ready to leave, the better. We have found what we came to find—let's leave the rest to the next expedition."

And so we disposed ourselves for sleep that night with hope for a bedfellow. For the first time we had a definite clear-cut plan for escape from our Martian prison. I slept like a top the whole night through.

(*To be concluded*)

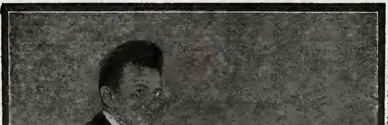
PRESENTING PAUL

● Some time ago in response to a request from the mass of our readers we promised to publish a picture of Paul and to tell our readers something about this master of science fiction illustrating.

But Paul has been shy, camera shy, and it is only a few days ago that we finally cornered him with the camera and he consented to pose. The picture shows him at work on a WONDER STORIES cover design.

Paul has an unique system for his illustrating. In his comfortable New Jersey suburban home he works intently on an illustration for our magazine while his children take turns reading new stories to him. Working on one illustration, and meanwhile absorbing the data for another he keeps busy all the day.

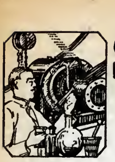
Many people like to whistle as they paint. Paul likes to listen, for as he says, "it really helps me to concentrate," This may seem strange, but so is all genius.



FRANK R. PAUL

Paul, through the medium of this picture wants us to say "Hello" to the thousands who call him "master of the art." He promises the continued giving of his fertile mind to science fiction, and to maintaining his reputation acquired over fifteen years of hard labor.

Many readers have wondered how he manages to reproduce other cities and places with so much fidelity. The fact is, as Paul says, he has over the past fifteen years acquired a tremendous library of scientific and geographical pictures. This he devotes to the use of his work for WONDER STORIES.



Science Questions and Answers

This department is conducted for the benefit of readers who have pertinent queries on modern scientific facts. As space is limited we cannot undertake to answer more than three questions for each letter. The flood of correspondence received makes it impractical also, to print answers as soon as we receive questions. However, questions of general interest will receive careful attention.

Rays From Living Beings

Editor Science Questions and Answers:

I read recently that living beings emit rays. Is this only a newspaper yarn or is there anything to it? Could you explain in your columns?

Bernard A. Marcus,
Wilmington, Del.

(There appears to be more than a newspaper story to the above facts. It seems that Alexander Gurwitch, a Russian physiologist discovered eight years ago that when an onion is placed in a horizontal position next to another in a vertical position, rays are emitted from the base of the horizontal onion that stimulate cell reproduction and growth in the vertical brother. On a basis of this experiment, verified by other research men, a number of other substances have been discovered that emit such helpful rays to stimulate living matter.

These ray emitters are found among such diverse things as bacteria, yeast plant, seedling potatoes, blood of human beings, muscle, cancerous tissue, mash of Drosophila (fruit fly). Curiously enough, however, the known receptors of these rays are so far limited to onion root and yeast. But the rate of growth of these substances ARE speeded up under the influence of the emitted rays.

Research workers found, by putting quartz plates in between the emitter and the receptor, that the rays are of the wavelength of ultraviolet light, although they do not state definitely that they ARE ultraviolet. It was found also, that each emitting being had a certain center from which the rays appeared to be emitted. Thus the center of the onion was its base, the rest of the onion being useless as an emitter of rays. The heads of young tadpoles give off effective rays, and only the heads. Malignant tumors emit rays in the strongest fashion, but benign tumors are less effective.

It is possible that the ordinary processes of cell growth and change in the emitter causes an energy change that is accompanied by a release of energy in the form of rays. This is what happens in the decomposition of radium and uranium. However the studies of Gurwitch and those who followed him offer an interesting field for further work with results that may be very surprising.—*Editor.)*

Size of the Solar Planets

Editor Science Questions and Answers:

Would you kindly publish in your excellent questions and answers department the size, that is, the diameter of the solar planets as well as the size of their orbits. In either case approximate figures will do.

Frank C. Havix,
Portland, Me.

(The following figures are offered as the diameters of the solar planets, as well as the radius of their orbits. This latter figure means, of course, their mean distance from the sun.

	Diameter of Body		Radius of orbit		
Mercury	3,000	miles	36	million	miles
Venus	7,700	"	67	"	"
Earth	7,900	"	93	"	"
Mars	4,200	"	142	"	"
Jupiter	86,500	"	483	"	"
Saturn	73,000	"	886	"	"
Uranus	31,900	"	1,782	"	"
Neptune	34,800	"	2,971	"	"
Pluto (estimated)	4,000	"	4,000	"	"
Transplutonian Planet	?		?		
Sun	866,400	"			
Moon	2,163	"	240	thousand miles	

The orbit of Pluto is supposed to be very eccentric, varying almost a billion miles between its closest and further distance from the sun. The figure of four billion miles may be accepted as a mean approximation.—*Editor.)*

The Missing Link

Editor Science Questions and Answers:

Every so often the newspapers report the real discovery of "the missing link." It puzzles me at times to discover just what missing link scientists are after, and how they expect to recognize him. Can you enlighten?

Jerome Favis,
Birmingham, Ala.

(We don't blame our correspondent for being puzzled. Perhaps our anthropologists become occasionally puzzled themselves in their elusive search. The idea of the missing link goes back to the nineteenth century when hot warfare was being waged over Darwin's "Origin of Species." Since man was supposed to have descended (or rather arisen) from the apes the question naturally arose, "if this is true then a link between man and ape, or rather a bridge, should be discovered somewhere." If such a discovery of an ape-man were made then the theory of evolution as applied to man would be proved.

At that time there was in the popular mind a naive idea that Darwin postulated a direct ancestral or straightline connection between man and monkey, whereas Darwin actually stated that man and monkey had common ancestors. The search for a missing link therefore, must arouse the question, "link to what?" If man arose from a mammal that also sired the monkey we must search for that primitive unknown ancestor, and not for a man-monkey link.

A number of pre-human remains have been found of races supposed to be missing links. But the direct association of these races with humanity is problematical. The *Pithecanthropus erectus* is merely an erect apeman of some 500,000 years ago, with a skull cap intermediate between that of ape and man. The Piltdown remains are of a race a little closer to man than the *Pithecanthropus.* The Heidelberg man is supposed to be a really human. These are the links that are the most ancient.

When the Neanderthal man was discovered it was hailed also as a missing link. Yet the Neanderthal is now believed as are some of the others as offshoots of a walking ape race from the same stock as mankind. It was, so to speak, a blind alley of evolution. Neanderthal man reached the peak of his evolution and died out, even at a time when the ancestors of the human race might have been evolving in another part of the world.

Even Cro-magnon man is supposed to be an offshoot of the general human stock, although of a much higher order than the Neanderthal. The picture that we have therefore is of a great tree from which branches, and sub-branches shoot out. Some of the branches (or offshoots) of the parent stock are weak stunted and eventually die, others like the human stock mastered its environment and lived on. Of that parent stock we know nothing. With the apes and, further back, with the monkeys, we feel a family connection, but to expect a direct link between us, is to expect a cross branch between two branches of a tree.—*Editor.)*

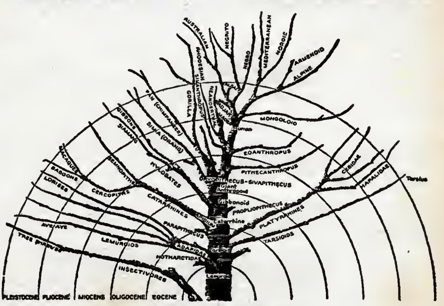


Fig. 51. The primate family tree.

This illustration from "Up From the Ape" by Prof. E. A. Hooton (Macmillan) shows the tree of the family of animals to which man belongs. It will be noticed in the upper part of the tree that the human branch is merely a part of a large group of primates from the same stem as PITHECANTHROPUS. Another offshoot from this general stem is the Neanderthal man and also the EOANTHROPUS. In other words, man is not descended from these sub-human species, but merely comes from the same general family stem. It will be noticed also that the various members of the monkey family belong to other branches. At best, man is a cousin to the monkeys rather than a lineal descendant.

READERS

If you like "Science Questions and Answers" in this magazine, you will find in our sister magazine, Everyday Science and Mechanics, a similar department, greatly expanded called "The Oracle." Look for it, you science fans!

The Reader Speaks

IN THIS department we shall publish every month your opinions. After all, this is your magazine and it is edited for you. If we fall down on the choice of our stories, or if the editorial board slips up occasionally, it is up to you to voice your opinion. It makes no difference whether your letter is complimentary, critical, or whether it contains a good old-fashioned brick bat. All are equally welcome. All of your letters, as much as space will allow, will be published here for the benefit of all. Due to the large influx of mail, no communications to this department are answered individually unless 25c in stamps to cover time and postage is remitted.

From Evolution to Free Love

Editor, WONDER STORIES:

I just got the latest issue and read P. S. Miller's letter. I now take time to notice I was so excited over it that I didn't even think to put a heading on the letter. Consider it headed.

Both Smith and Miller take cracks at Huxley's *"Brave New World"* while admitting that they have not read it. Well, I have not read his other works, so am more or less unbiased. It seemed to me the result of careful consideration of our system, its faults, and a quite probable trend. It contained just enough of what we are supposed to consider smut to show that it is not, and pointed out that under different conditions some of our most sacred thought-symbols might be considered smutty. All in all I thought it a most laudable work, but that may be just the anthropologist in me. (A girl here tells me she was warned against studying anthro. The anthropologists are an immoral lot: believe in every kind of sedition from evolution to free love.)

I don't entirely agree with Miller's classification of fiction, but sufficiently so, that I may use it as a working hypothesis. He says the bell-shaped curve is moving "upward" (a term which is anathema to most anthropologists, but often useful, nae-the-less). I sincerely hope not, as I enjoy CAS, but could not bear a magazine as full of that sort, as present ones are of interplanetary rot. The latter is dilute and weak enough to be bearable in large doses, however monotonous, but the "second fantasy" such as CAS, PSM, and Abraham Merritt write, is too concentrated to allow such wholesale dispensation.

Peter Schuyler further says, "I do mean that we're done with day-dreams, and are headed toward bigger problems, human problems,—" "The Dimension of Chance" is an instance of a problem. The problem of what sort of a world might be expected where the laws of the physical world were more erratic than here where they operate with a high statistical accuracy. "Brave New World" is an attempt to solve the problem of human happiness. Mr. Huxley achieves this by the time-honored Christian method of loading the sorrows of the world upon one man who governs the world, is looked up to with devotion and awe by the carefree populace, and by way of compensation indulges in old literature which, if given to the masses would bring them doubts, destroy their happiness, and likewise the system. The world of the story is, like the Northwest Coast Indians, in a permanent state of inflation, and like the Indians and unlike ourselves has a permanent machinery of deflation and liquidation which thus prevents depressions.

Clifton Amsbury,
Lincoln, Nebr.

(We wish Mr. Amsbury would some day explain the cryptic references to CAS and PSM. Are they references to Clark Ashton Smith and P. Schuyler Miller?

Speaking of "Brave New World" it might be worth the reading of our readers. It gives the caustic, bitter and disillusioned opinion of one observer on the future state, granting that all of our economic problems are settled.—*Editor.)*

Opposed to Foreign Authors

Editor, WONDER STORIES:

In a recent editorial you announce that future issues of WONDER STORIES will contain an increasing number of stories by foreign authors. That fact, I believe, and a considerable number of my friends believe, is to be deplored. If the recent stories printed under foreign names are any criteria WONDER STORIES is making a bad mistake.

Some time ago, for example, you gave us a story by an Englishman, Walter Kateley (Mr. Kateley is an American from Cleveland, Ohio—Editor) which was beyond question one of the worst WONDER STORIES has had in many a day. The stupid way in which the benevolent Martian sent his "Message from Mars" (our author probably refers to the story by Ralph Stranger) across the reaches of interstellar space to register on some hypothetical gland of a man's brain—oof—the whole yarn was incredibly adolescent, even infantile compared to the stories you publish.

Again we were afflicted with "After 8,000 Years" ("In the Year 8000"—Editor) by Otfrid von Hanstein. It was an insult to our intelligence. After wandering about for two installments vacillating between two entirely separate plots, he bludgeons us with his smashing climax in which we are supposed to believe that the heart is the seat of the emotions.

S. S. Held's "Death of Iron" is not so positively offensive, but there seems to be nothing, except a basic idea, either new or interesting.

I do not assert that all foreign authors have no appeal to American tastes. Mr. Juve is a brilliant and satisfying exception (Mr. Juve resides in the state of Oregon—Editor). But I do think that it is decidedly unwise to offer any more stories to your presumably intelligent readers of such caliber.

William Biersach,
Hollywood, Calif.

(We can do nothing in this case except to refer it to the court of last opinion—our readers. What do you think of Mr. Biersach's indictment?—*Editor.)*

The Universe is a Gas

Editor, WONDER STORIES:

I've an idea which has been milling around in my head for a long time (there being plenty of room for it to do so) which I'd like to present here. In the many stories you've published there have been any number of theories advanced as to the ultimate nature of the universe. Most of them were without real scientific foundation but some were plausible. The one I wish to state here has some but not many known facts to substantiate it.

In Physics, a substance is generally defined as a gas when 1—the relative velocities of its molecules are great; 2—its molecules are independent of each other in their motion; and 3—the distances between adjacent molecules are relatively large. A fourth criterion is that a gas fills any vessel in which it is put completely.

Consider our universe. 1—The stars move at high velocities with respect to each other. Some of the distant nebulae are receding from the Earth with velocities of about 12,000 miles per second, a velocity which is pretty high, the results of the 100 yard dash in the last Olympiad notwithstanding. Secondly, the stars are so far apart that their gravitational attraction for each other is negligible. That is, they are independent of each other in their motion. Third, on Earth, the distance between adjacent molecules of a gas at one atmosphere pressure is supposed to be thirteen times the diameter of the molecule. The distance between the Sun and Alpha Centauri is thousands of times the diameter of the orbit of Pluto. And as for the fourth requirement, so far as we know the universe has no definite shape and is expanding indefinitely.

From these four considerations, the conclusion may be reached that the universe is a rare, expanding gaseous mixture of various molecules. In this gas, the Sun and all its planets form one atom.

Milton Kaletsky,
New York, N. Y.

(Since our place in the universe is so microscopic and what we know about events outside our own little corner is so infinitesimal, there is nothing yet observed to disprove Mr. Kaletsky's general assertion. It is not necessary, however, to definitely class the universe as a gaseous mixture. We can say, however, that the universe might be a higher form of matter—that is, a bit of matter, of which our earth is as infinitesimal as a molecule is to a mountain.—*Editor.)*

ON LETTERS

BECAUSE of the large number of letters we receive, we find it physically impossible to print them all in full. May we request our correspondents, therefore, to make their letters as brief and to the point as they can; as this will aid in their selection for publication? Whenever possible, we will print the letter in full; but in some cases, when lack of space prohibits publishing the complete letter, we will give a resume of it in a single paragraph.

Tired of Strange People

Editor, WONDER STORIES:

The December issue of WONDER STORIES was marvelous. As for the "Wreck of the Asteroid"—that is Manning's best. There are no goofy Martians as yet, and the story is not drawn out.

"The Time Express" was very logical, and yet one thing puzzles me. If nothing from the future could go back to past ages, how could the time express go into the future and the people not fall to dust?

"Space Rays" was Campbell's most humorous story. As for "Death of Iron" it was next to Manning's story. "The Planetoid of Doom" was also very good. Colladay always scores a hit. In plain language the new issue was swell.

The October issue was not as good as usual although "The Venus Germ" was another hit. "The Dimension of Chance" was well written but not plausible. "The Asteroid of Gold" was the same old stuff—"big bad man takes away lotta gold from itta bitty boys." "The Lake of Life" was good but I'm tired of hearing about strange people in the heart of central Australia.

"The Crisis with Mars" and "Guardians of the Void" were the best in the QUARTERLY. "Emissaries of Space" was too long.

Jack Rather,
Brooklyn, N. Y.

(As Schachner explained in "The Time Express," people could go forward into the future, just as we ordinarily do through the simple process of living. But if they were to try to return to the past they would flash into nothingness. Naturally the idea is a complicated one; and Mr. Schachner tried to make it as simple as possible without delving into Einsteinian mathematics.—*Editor.)*

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LIST OF PLATES
Plate I. Nude Adult Female
Plate II. Nude Adult Male
Plate III. Nervous Systems of Female
Plate IV. Skeletal System
Plate V. Muscular System (Posterior)
Plate VI. Muscular System (Anterior)
Plate VII. Vascular System
Plate VIII. Respiratory System
Plate IX. Digestive System
Plate X. Male Genital Organ in Detail
Plate XI. Female Genital Organ in Detail
Plate XII. Cross-Section of Pregnant Female Body with Child

Thus far, plates such as those presented here have been so high in price as to be inaccessible to the general public. Our plan in producing these charts is to make them available to every adult person.

The book is 14 inches high and 6½ inches wide. It contains twelve full-page color plates and twelve text pages illustrated with fifty photographs and drawings, made from actual photographs, and all organs and parts of the human body—male and female—are shown in great detail in natural colors.

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The New Price Brought Him

Editor, WONDER STORIES:

I have just finished reading "The Venus Germ" by R. F. Starzl and F. Pragnell. This is the only story I have read in the November issue. I have found this story to be so exciting and so crammed with tense moments that I could not wait to read the rest of the stories until I had written you.

This is the first time I have purchased WONDER STORIES but believe me it is far from the last. In looking back over the stories following this one I have mentioned, I find that many more pleasant evenings are in store for me in the way of fresh thrills.

Another welcome feature is your latest price of 15c. I know that this reduction will get many more loyal readers for WONDER STORIES, and I state frankly that the new price is what brought me into contact with your talented writers and their prophetic fiction. Tonight after finishing writing this letter I intend to dig into the second story in the November issue.

In closing I wish to state that I am proud to live in a country in which there are so many magazines that furnish recreation, education and useful knowledge to the reading public. Bear in mind that I am thinking of WONDER STORIES.

Charles E. Diehlman,
219 South Pickaway St.,
Circleville, Ohio.

(We enthusiastically welcome our new reader into our rapidly growing circle. We have found from the experience of the last two years that the type of story—good fiction, with a sound scientific idea, imaginative and stimulating—we have been publishing is what our readers want. We intend to follow that policy consistently.—*Editor.)*

Medical and Biological Wanted

Editor, WONDER STORIES:

The "Wreck of the Asteroid" is going to be better than "The Voyage of the Asteroid"; and I enjoyed the latter very much. Please have the installments of your serials longer. They were formerly twice as long.

"The Time Express" is certainly an interesting story. In fact I have never read a dull story by Nathan Schachner. "Space Rays" was good but I hope that Mr. Campbell's future tales for WONDER STORIES are real science fiction. The kind he knows how to write.

Instead of publishing just adventure stories of science how about including stories of new inventions? Stories that take place or at least start in the laboratory. Stories of biology and medicine. (Dr. D. H. Keller.) Stories of the marvels of chemistry.

Paul's cover for December is an excellent one and his illustrations are much better than those in the November issue. Where is that promised picture of Paul?

Jack Darrow,
Chicago, Ill.

(We include, finally, in this issue the promised picture of Paul with a short personal sketch of his life and career. We are taking to mind the request for medical and biological stories. The difficulty we have found with them in the past is that an author will take a new medical and biological idea and become so enwrapped with his idea that he neglects to build a story about it. The idea then generally remains sterile and fails to get across. However, we will see what we can do for Mr. Darrow.—*Editor.)*

Attention, Mr. Shipley

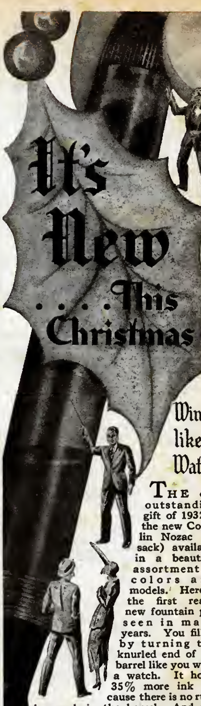
Editor, WONDER STORIES:

In the October issue of WONDER STORIES I read a letter written by A. W. Shipley, McKeesport, Pa.

Being very much interested in what Mr. Shipley wrote, I wrote to him at the address given, but, the letter was returned to me as undeliverable.

I wonder if you are able to give me his address so that my letter will reach him.

John Lange,
Route 2, Mercedes, Texas.



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BOOK REVIEWS

● **THE INTERPRETATION OF THE ATOM, by Frederick Soddy, M. A., F. R. S.; cloth, xviii, 355 pp., inserted illustrations and tables, 5¾x8¾ inches. Published by G. P. Putnam's Sons, New York. Price $5.00.**

One of the men who has done most to advance our knowledge of the composition, not merely of the radioactive elements, but of all matter, Professor Soddy, writes with the utmost simplicity that the overwhelmingly complicated nature of his subject permits. The work is so arranged that the non-technical reader can derive a fair acquaintance of the subjects, without having to follow up the technical details given for the serious student and the experimenter. The use of formulas in the highest mathematics has been carefully avoided; though reference is made to the works in which they may be found and studied.

What is notable about the work is the intellectual conservatism it displays in a world of uprooted science. Like the founder of the modern science of chemistry Professor Soddy is "sceptical"; unwilling to enthuse over an unproved theory, or to concede conclusions that seem beyond common sense, until the alternatives have been exhausted. It is quite possible that some other distinguished scientists will read a gentle—or severe—criticism in these pages. "Physics," writes the author, "is suffering acutely from the bane of all philosophy that accepts its ideas from those with only a very indirect hearsay acquaintance with the facts." "Personally," his preface confesses, "I more and more come to regard the purely formal and mathematical presentation of physical theories as a disguise and evasion of the real problems, rather than as any solution of them."

"Even in science," says Soddy, reviewing the wreckage of the work of the nineteenth century's most careful chemists, "though not often, it happens that the prize is not always to the accurate, meritorious and deserving investigator, fully equipped and disciplined for the work in hand, but to the imaginative tyro." He cites the theory of complex atoms, put forth by Dr. Prout, a Scotch physician, in 1815, which has "a century later become the cornerstone of the modern theories."

With all the author's caution, he may startle many a reader with some of the data and hypotheses he marshals. "Every measurement (of the velocity of light) has uniformly given a lower velocity than the last. If the rate of diminution were maintained, the velocity would be zero, by A. D. 62,000."

"We cannot, and possibly shall never be able to, observe whether light is propagated through completely empty space, and, therefore, we ought not to assume that it is. In a tentative theory of Sir Joseph Thomson, electromagnetic influences were regarded as being propagated along 'Faraday tubes of force,' which ended on two opposite charges. If so, one would hardly expect light to travel except in directions occupied at both ends by matter." (A remarkable extension of the old query, whether there can be sound without an ear to hear it. Can there be light without something to shine on?)

"If a gram of ionized hydrogen could be got and kept together in one place, and placed as far apart from another similar gram as the poles of the earth, the repulsive forces between them, though it falls off as the square of the distance apart, would still be at this distance equal to 26 tons." (A suggestion to interplanetary engineers.)

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